

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
DIVISION OF RADIOLOGICAL HEALTH

RADIOACTIVE MATERIAL LICENSE

SUPPLEMENTARY SHEET

Page 4 of 8 Pages

License Number R-73014-H95

10. Authorized use

A. through GG. For the burning of liquid scintillation type fluids as fuel in accordance with statements, representations, and procedures contained in material referenced in Condition 27. of this license.

HH. For use in instrument calibration and standardization.

II. For use in Tracor Models 111019 or 115500 electron capture detectors as part of Tracor 540 gas chromatographs.

Conditions (continued)

12. The licensee shall comply with applicable provisions of 1200-2-4, 1200-2-5, and 1200-2-10 of "State Regulations for Protection Against Radiation".

13. Radioactive material authorized by this license shall be used only at Route 3 Gallaher Road, (Junction of Gallaher Road and I-40), Kingston, Tennessee 37763.

14. Radioactive material authorized by this license shall be used by, or under the supervision and in the physical presence of, James R. Sims, Joseph Crider, or James T. McVey.

The radiation safety officer for this license is James T. McVey.

15. Pursuant to 1200-2-8-.21 of "State Regulations for Protection Against Radiation", the licensee may dispose of radioactive material by incineration in accordance with procedures contained in application dated October 5, 1987, with attachments and material referenced in Condition 27 of this license. The quantity of radioactive material burned, by the licensee, in any one year shall not exceed Twenty Two and a half (22.5) Curies of Hydrogen 3 and Carbon 14 combined total and One and a half (1.5) Curies combined total of all other isotopes authorized by this license. In addition, no fluids shall be burned which have concentrations in excess of 0.05 microcurie/gram of Hydrogen 3 and Carbon 14 combined, or 0.002 microcurie/gram of all other isotopes authorized by this license combined.

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The radioactivity in the gaseous effluent from the facility shall not exceed the limits specified for air in either Schedule RNS 8-1, Table II, Column 1 of "State Regulations for Protection Against Radiation" or the National Emission Standards for Hazardous Air Pollutants; Standards for Radionuclides (40 CFR Part 61) which ever are more restrictive.

16. The licensee shall maintain complete and accurate records of the receipt and disposal of radioactive material. The licensee shall, for radioactive material no longer useful for any purpose and for any equipment or supplies contaminated with such material for which further use and decontamination is not planned, define those materials as radioactive waste and treat them as such in accordance with the following provisions:
 - A. Radioactive waste material shall not be stored with non-radioactive waste.
 - B. A written record of all radioactive waste material shall be maintained until it has been determined by a suitable survey or radioassay that it has decayed to background levels or until it has been shipped to an authorized recipient in accordance with all applicable regulations. Accountability of radioactive waste material prepared for shipment but not yet shipped from the licensee's premises shall be maintained by the licensee by an internal record system such that the licensee is constantly aware of the material's location and the proposed time of shipment. Individuals who are involved in the shipping of such material and/or the storage of such material prior to shipment, shall be trained in the precautions necessary for such handling and storage.
 - C. For material which has decayed to background levels as determined by radioassay or external level as measured with appropriately calibrated instruments, records shall indicate that the material was determined to be no longer radioactive and will indicate the methods and results of the survey or analysis.
 - D. Shipment records of radioactive waste material shall be maintained and the licensee shall require written confirmation from the authorized recipient of such material that this material has been received.
 - E. All records and written confirmations required by this condition shall be maintained for inspection by the Department.

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License Number R-73014-H95

The requirements for this condition are in addition to any other requirements for the handling and/or disposal of radioactive material contained in this license and "State Regulations for Protection Against Radiation".

- 17.A. Sealed sources authorized by this license shall be tested for leakage and/or contamination at intervals not to exceed three (3) years. In the absence of a certificate from a transferor indicating that a test has been made within six (6) months prior to transfer, the sealed source shall not be put into use until tested.
 - B. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surface of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak tests shall be kept in units of microcuries and maintained for inspection by the Department.
 - C. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Department regulations. A report shall be filed within five (5) days of the test with the Division of Radiological Health, Tennessee Department of Health and Environment, 150 9th Avenue North, Nashville, Tennessee, 37247-3201, describing the equipment involved, the test results, and the corrective action taken.
 - D. Tests for leakage and/or contamination shall be performed in accordance with statements, representations, and procedures contained in application dated October 5, 1987, with attachments, and material reference in Condition 27 of this license or by persons specifically licensed by this Department, the U. S. Nuclear Regulatory Commission, or another Agreement State to perform such services.
18. Notwithstanding the periodic leak test required by Condition 17, any licensed sealed source is exempt from such leak tests when the source contains 100 microcuries or less of beta and/or gamma emitting material or 10 microcuries or less of alpha emitting material.
 19. Detector cells containing Nickel 63 authorized by this license shall only be used in conjunction with a properly operating temperature control mechanism which prevents the temperature of the foil from exceeding 400 degrees centigrade.

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RADIOACTIVE MATERIAL LICENSE

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License Number R-73014-H95

20. Maintenance and repair of detector cells containing radioactive material shall be performed only by the manufacturer or by other persons specifically authorized by the Department, the U. S. Nuclear Regulatory Commission or another Agreement State to perform such services.
21. Detector cells containing licensed material shall not be opened or the foil sources removed from the detector cell by the licensee.
22. When not installed in a gas chromatograph, detector cells containing licensed material shall be stored in a properly labeled container under lock and key to prevent access by unauthorized individuals.
23. In lieu of using the conventional radiation caution colors (magenta or purple on yellow background) as provided in 1200-2-5-.12(1) of "State Regulations for Protection Against Radiation", the licensee is hereby authorized to label detector cells and cell baths, containing byproduct material and used in gas chromatography devices, with conspicuously etched or stamped radiation caution symbols without a color requirement.
24. Survey instrument calibration shall be performed in accordance with statements, representations, and procedures contained in application dated October 5, 1987, with attachments, and material referenced in Condition 27 of this license.
25. No provision of this license relieves the licensee from compliance with other Federal, State and local laws, ordinances, and regulations applicable to the licensee's activities.
26. The licensee is authorized to perform instrument calibration and leak testing of sealed sources in accordance with statements, representations, and procedures contained in correspondence referenced in Condition 27 of this license.

The tests shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample, or in the case of radium, the escape of radon at the rate of 0.001 microcurie per 24 hours. The customer shall be furnished a report of the results in units of microcuries.

If the test reveals the presence of 0.005 microcurie or more of removable contamination, or in the case of radium, the escape of radon at the rate of 0.001 microcurie or more per 24 hours, the customer of the licensee shall be informed of the Department's requirements as follows: "The

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DIVISION OF RADIOLOGICAL HEALTH

RADIOACTIVE MATERIAL LICENSE

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licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Department regulations."

A report shall be filed within five (5) days of the test with the Division of Radiological Health, Tennessee Department of Health and Environment, 150 9th Avenue North, Nashville, Tennessee 37247-3201, describing the equipment involved, the test results, and the corrective action taken.

27. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive material described in Items 6, 8, and 9 of this license in accordance with statements, representations, and procedures contained in application dated October 5, 1987, with attachments, and letters dated August 18, 1987, with attachments, October 5, 1987, with attachments, November 10, 1987, with attachments, March 3, 1988, with attachments, April 13, 1988, with attachments, April 14, 1988, with attachments, June 14, 1988, with attachments, September 2, 1988, with attachments, June 5, 1989, with attachments, April 24, 1990, with attachments, July 5, 1990, with attachments, and August 7, 1990, with attachments.

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
DIVISION OF RADIOLOGICAL HEALTH

RADIOACTIVE MATERIAL LICENSE

Amendment 1

Page 1 of 3 Pages

License Number R-73014-H95

Diversified Scientific Services, Inc.
P.O. Box 863
Kingston, TN 37763

Attention: James T. McVey, Executive Vice President

Gentlemen:

As requested by James T. McVey and in accordance with his letters dated December 10, 1990, January 17, 1991, February 25, 1991 with attachments, March 5, 1991 with attachments, March 14, 1991 with attachments (two letters), and March 18, 1991, your Tennessee Radioactive Material license is amended as follows:

To add:

6. Radioactive Material (Element and <u>Mass Number</u>)	8. Chemical and/or <u>Physical Form</u>	9. Maximum Radioactivity and/or quantity of material which licensee may possess at <u>any one time</u>
JJ. Any radioactive material with atomic numbers 1 through 83, inclusive, except as in A. through II. and KK. through TT.	JJ. Same as in 8A.	JJ. The total combined isotopic activities <u>shall not exceed</u> 1 Curie at any one time.
KK. Cr-51	KK. Same as in 8A.	KK. 2 Curies
LL. Cs-134	LL. Same as in 8A.	LL. 2 Curies
MM. Tc-99	MM. Same as in 8A.	MM. 2 Curies

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
DIVISION OF RADIOLOGICAL HEALTH

RADIOACTIVE MATERIAL LICENSE

Amendment 1

Page 2 of 3 Pages

License Number R-73014-H95

NN. Ge-68	NN. Same as in 8A.	NN. 2 Curies
OO. Uranium (not U-233 or U-235)	OO. Same as in 8A.	OO. Total quantity authorized in Items OO. and PP. is 200 kilograms
PP. Thorium	PP. Same as in 8A.	PP. See Item OO.
QQ. Radium	QQ. Same as in 8A.	QQ. 10 millicuries
RR. Uranium 235	RR. Same as in 8A.	RR. 175 grams*
SS. Uranium 233	SS. Same as in 8A.	SS. 100 grams*
TT. Plutonium	TT. Same as in 8A.	TT. 100 grams*

* For each kind of special nuclear material, determine the ratio between the quantity of that special nuclear material and the quantity specified here for the same kind of special nuclear material. The sums of such ratios for all kinds of special nuclear material in combination shall not exceed "1" (i.e., unity). In accordance with letter dated January 17, 1991 and signed by James T. McVey, the amount of special nuclear material allowed under this license is one-half of the amount defined in "State Regulations for Protection Against Radiation" 1200-2-4-.04(oo).

10. Authorized Use

JJ. through TT. Same as A. through GG.

To change Condition 27. This condition will now read as follows:

27. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive material described in Items 6, 8, and 9 of this license in accordance with statements, representations, and procedures contained in application dated October 5, 1987 with attachments and letters dated August 18, 1987 with attachments, October 5, 1987 with attachments, November 10,

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
DIVISION OF RADIOLOGICAL HEALTH

RADIOACTIVE MATERIAL LICENSE

Amendment 1

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License Number R-73014-H95

1987 with attachments, March 3, 1988 with attachments, April 13, 1988 with attachments, April 14, 1988 with attachments, June 14, 1988 with attachments, September 2, 1988 with attachments, June 5, 1989 with attachments, April 24, 1990 with attachments, July 5, 1990 with attachments, August 7, 1990 with attachments, December 10, 1990, January 17, 1991, February 25, 1991 with attachments, March 5, 1991 with attachments, March 14, 1991 with attachments (two letters), and March 18, 1991.

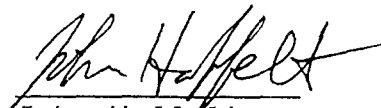
This amendment authorizes by reference the design and installation of air sampling probes in accordance with letters signed by James T. McVey dated February 25, 1991 with attachments, March 5, 1991 with attachments, and March 14, 1991 with attachments.

All other parts of this license remain unchanged.

Date: March 19, 1991

For the Commissioner
Tennessee Department of Health
and Environment

By:



John Hoffelt
Environmental Specialist
Division of Radiological Health

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
DIVISION OF RADIOLOGICAL HEALTH

RADIOACTIVE MATERIAL LICENSE

Amendment 2

Page 1 of 2 Pages

License Number R-73014-H95

Diversified Scientific Services, Inc.
P.O. Box 863
Kingston, TN 37763

Attention: James T. McVey, Executive Vice President

Gentlemen:

As requested by James T. McVey and in accordance with his letter dated April 15, 1991, your Tennessee Radioactive Material License number R-73014-H95 is amended as follows:

To add Condition 28. This condition shall read as follows:

28. The licensee is authorized to store drums of materials described in letter dated April 15, 1991 in excess of 180 days not to exceed June 1, 1991.

To change Condition 27. This condition will now read as follows:

27. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive material described in Items 6, 8, and 9 of this license in accordance with statements, representations, and procedures contained in application dated October 5, 1987 with attachments and letters dated August 18, 1987 with attachments, October 5, 1987 with attachments, November 10, 1987 with attachments, March 3, 1988 with attachments, April 13, 1988 with attachments, April 14, 1988 with attachments, June 14, 1988 with attachments, September 2, 1988 with attachments, June 5, 1989 with attachments, April 24, 1990 with attachments, July 5, 1990 with attachments, August 7, 1990 with attachments, December 10, 1990, January 17, 1991, February 25, 1991 with attachments, March 5, 1991 with attachments, March 14, 1991 with attachments (two letters), March 18, 1991, and April 15, 1991.

All other parts of this license remain unchanged.

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
DIVISION OF RADIOLOGICAL HEALTH

RADIOACTIVE MATERIAL LICENSE

Amendment 2

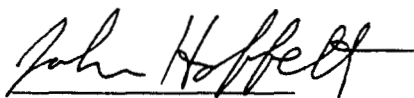
Page 2 of 2 Pages

License Number R-73014-H95

Date: April 17, 1991

For the Commissioner
Tennessee Department of Health
and Environment

By:



John Hoffelt
Environmental Specialist
Division of Radiological Health

Exhibit B3

TREATMENT, STORAGE, AND DISPOSAL PERMIT FOR DSSI

State of Tennessee
Department of Health and Environment
Division of Solid Waste Management

Hazardous Waste Management Program
4th Floor, Customs House
701 Broadway
Nashville, Tennessee 37219-5403
(615) 741-3424

PERMIT

Permittee: Diversified Scientific Services Incorporated
Route 3, Gallaher Road
P.O. Box 863
Kingston, Tennessee 37763
Installation Identification Number: TND 98 210 9142
Permit Number: TNHW-024

Pursuant to the Tennessee Hazardous Waste Management Act, as amended (Tennessee Code Annotated 68-46-101 et seq), and regulations (Chapter 1200-1-11) promulgated thereunder by the Tennessee Solid Waste Disposal Control Board, a permit is issued to Diversified Scientific Services Incorporated (hereinafter called the Permittee or DSSI), to construct and operate a hazardous waste storage facility to be located at Gallaher Road near Interstate 40 just outside Kingston, Tennessee, Roane County at latitude 35° 52' 05" and longitude 84° 27' 10". The Permittee will be allowed to store and recycle hazardous waste subject to the terms of this permit.


The Permittee must comply with all terms and conditions of this permit. This permit consists of the conditions contained herein (including those in any attachments) and the applicable regulations contained in Rule Chapter 1200-1-11, as specified in the permit. Applicable regulations are those which are in effect on the date of issuance of the permit, except for the applicable fee requirements of Rule 1200-1-11-.08, applicable land disposal restriction requirements of Rule 1200-1-11-.10, and the permit continuation, transfer, modification, revocation and reissuance, and termination provisions at Rule 1200-1-11-.07(9). Any lawfully promulgated modification made to these excepted regulations during the effective life of this permit shall be considered applicable regulations.

Continuation, Transfer, Modification, Revocation and Reissuance, and Termination of this permit must comply with and conform to Rule 1200-1-11-.07(9).

This permit is based on the assumption that the information submitted in the original permit application and subsequent modifications thereto (hereinafter referred to as the application) is accurate and that the facility will be constructed, operated, maintained, and closed as specified in the application. The Permittee's failure in the application to disclose fully all relevant facts, or the Permittee's misrepresentation of any relevant facts at any time may be grounds for termination of this permit and potential enforcement action. The Commissioner may modify this permit if information is received which was not available at the time of permit issuance and which justifies the application of different permit conditions at the time of issuance. The Permittee must inform the Tennessee Department of Health and Environment, Division of Solid Waste

Management, of any deviation from or changes in the information in the application which would affect the Permittee's ability to comply with the applicable regulations or permit conditions.

This permit is effective as of August 4, 1989, and shall remain in effect until August 4, 1999, unless revoked and reissued, or terminated, or continued.



Tom Tiesler, Director
Division of Solid Waste Management
Tennessee Department of Health and Environment

JTT/kl



STATE OF TENNESSEE
CUSTOMS HOUSE
701 BROADWAY
DEPARTMENT OF HEALTH AND ENVIRONMENT
NASHVILLE, TENNESSEE 37247

January 23, 1991

Mr. James T. McVay
Diversified Scientific Services, Inc.
P.O. Box 863
Kingston, TN 37763

Dear Mr. McVay:

The Tennessee Division of Solid Waste Management acknowledges your request of December 14, 1990 for a major modification pursuant to the rules governing Tennessee Rule Chapter 1200-1-11-.07(9)(c)(5)(x111)(I) to add the additional EPA waste codes (Attachment 1).

The modification to your permit will be processed under the now pending regulations dealing with the new TCLP and modification classifications by March 1, 1991.

This letter serves as notice that the facility can handle the new waste codes until the final modification is made to the facility permit No. TNHW-024.

If there are any additional concerns, please feel free to contact Ms. Hymelia Norris of my staff at (615) 741-3424.

Sincerely,

A handwritten signature in cursive script, likely of Tom Tiesler, is written over the "Sincerely," line.

Tom Tiesler, Director
Division of Solid Waste Management

JTT/F5081022

cc: James Scarbrough, EPA, Region IV
Dale Ozier
Jack Crabtree, Knoxville F.O.
Rick Brown, Knoxville F.O.
Jacqueline Okoreeh-Baah, Chief Hazardous Permitting

PA ID Number (enter from page 1)

Secondary ID Number (enter from page 1)

7 1 1 0 9 8 2 1 0 9 1 4 2

W. Description of Hazardous Wastes (continued)

Waste Number	A. EPA HAZARDOUS WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES														
				(1) PROCESS CODES (enter)						(2) PROCESS DESCRIPTION (if a code is not entered in D(1))								
1	1001	240,000	G	T	0	4	5	0	1	5	0	2	included above					
2	1101	included above	"															
3	4002																	
4	4003																	
5	4004																	
6	4007																	
7	4012																	
8	4019																	
9	4027																	
10	4029																	
11	4031																	
12	4037																	
13	4044												Y					
14	4052																	
15	4053	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y						
16	4055																	
17	4056																	
18	4057																	
19	4068																	
20	4070																	
21	4071																	
22	4072																	
23	4076																	
24	4077																	
25	4080																	
26	4083																	
27	4108																	
28	4110																	
29	4112																	
30	4117																	
31	4121																	
32	4122	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y						
33	4124																	

EPA ID Number (enter from page 1)

Secondary ID Number (enter from page 1)

7-10982109142

XIV. Description of Hazardous Wastes (continued)

D. PROCESSES AND TREATMENTS

Line Number	EPA ID HAZARDOUS WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	(1) PROCESS CODES (enter)						(2) PROCESS DESCRIPTION (if a code is not entered in D(1))	
	4140	included	as above								
	4154										
	4159										
	4161										
	4165										
	4169										
	4171										
	4196										
	4208										
	4209										
	4210										
	4211	✓	✓	✓	✓	✓	✓	✓	✓		
	4213										
	4220										
	4226										
	4227										
	4228										
	4235										
	4237										
	4328										
	4353										
	4359										
	F001										
	F002										
	F003										
	F004										
	F005										
	P002										
	P003										
	P075	✓	✓	✓	✓	✓	✓	✓	✓		

Exhibit B4

AIR POLLUTION CONTROL PERMIT FOR DSSI

TENNESSEE AIR POLLUTION CONTROL BOARD
DEPARTMENT OF HEALTH AND ENVIRONMENT
NASHVILLE, TENNESSEE 37247-3101



Permit to Construct or Modify an Air Contaminant Source Issued Pursuant to Tennessee Air Quality Act

Date Issued: **AUG 16 1991**

Permit Number:

Date Expires:

November 1, 1991

931365F

Issued To:

Installation Address:

Diversified Scientific Services, Inc.

I-40 & Gallaher Road
Kingston

Installation Description:

Emission Source Reference No:

Dual Fuel Boiler: Modification to Expand From
D001 Solvent to D001, F001 thru F005 Solvents;
Dry Baghouse Scrubber and Packed Tower Control
PES 01

73-0137-01

The holder of this permit shall comply with the conditions contained in this permit as well as all applicable provisions of the Tennessee Air Pollution Control Regulations.
This is not a permit to operate.

CONDITIONS:

1. This permit does not cover any air contaminant source that does not conform to the conditions of this permit and the information given in the approved application. This includes compliance with the following operating parameters:

The rated heat input for this source shall not exceed 14.5 million Btu per hour.

2. Particulate matter emitted from this source shall not exceed 0.48 pounds per million Btu heat input (6.96 pounds per hour).
3. Hydrogen chloride emitted from this source shall not exceed 5.0 pounds per hour.
4. Chlorine gas emitted from this source shall not exceed 0.029 pounds per hour.
5. Gaseous fluoride (as hydrogen fluoride) emitted from this source shall not exceed 0.0124 pounds per hour.

(continued on the next page)

HAROLD E. HODGES, P.E.
TECHNICAL SECRETARY

No Authority is Granted by this Permit to Operate, Construct, or Maintain any Installation in Violation of any Law, Statute, Code, Ordinance, Rule or Regulation of the State of Tennessee or any of its Political Subdivisions.

NON TRANSFERABLE

POST AT INSTALLATION ADDRESS

G-37

PH-0515

AUG 16 1991

931365F

6. Visible emissions shall not exceed 20% opacity as specified in Rule 1200-3-5-.01 of the Tennessee Air Pollution Control Regulations (aggregate count). Visible emissions from stacks will be determined by Tennessee Visible Emission Evaluation Method 2 as adopted by the Tennessee Air Pollution Control Board on August 24, 1984.
7. This permit shall serve as a temporary operating permit from initial start-up to the receipt of a standard operating permit, (regardless of the expiration date), provided the operating permit is applied for within thirty (30) days of initial start-up and the conditions of this permit and any applicable emission standards are met.
8. The Technical Secretary shall be notified in writing at least ten (10) days prior to start-up of the source.
9. Liquid propane gas, and the following solvents D001, F001 thru F005 only shall be used as fuel(s) for this source.
10. The boiler shall be operated at a temperature of at least 1,800°F.
11. This permit is valid only for the storage tank(s) listed below:

<u>Tank I.D.</u>	<u>Contents</u>	<u>Capacity</u>	<u>Turnovers/year</u>
01, 02, 03	D001, F001-F005 (mixture)	10,000 gallons (each)	55 (each)

12. A log of the boiler operating temperature and solvents burned (amount and type) on a daily basis must be maintained at the source location and kept available for inspection by the Technical Secretary or his representative. This log must be retained for a period of not less than two years.
13. Within 90 days after the issued date of this permit, a source test for chloride shall be conducted. The owner or operator shall furnish the Technical Secretary a written report of the results of this emissions performance test within 45 days of testing. Chloride emissions shall be determined utilizing EPA Method 26 as promulgated in the Federal Register, Volume 56; Number 30, February 13, 1991, beginning on page 5770 with the contents of the third and fourth impingers being analyzed for chlorine utilizing ion chromatography.

(continued on the next page)

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AUG 16 1991

931365F

14. Within 90 days after the issued date of this permit, a source test for gaseous fluorides shall be conducted. The owner or operator shall furnish the Technical Secretary a written report of the results of this emissions performance test within 45 days of testing. Gaseous fluoride emissions shall be determined utilizing either EPA Method 13A or 13B as published in the Federal Register, Vol. 45, No. 121, June 20, 1990, and subsequent amendments. For purpose of compliance with the gaseous fluoride emission standard contained in Condition 5 only the fluoride catch in the impingers will be considered. In conducting this testing the filter is to be placed between the probe and first impinger and the probe and filter shall be recovered and analyzed separately from the impingers.
15. The Technical Secretary shall be notified in writing at least 20 days prior to performing these compliance tests so that his representative may be present.
16. The chlorine and fluorine mass content of the fuel burned shall not exceed that which is equivalent to the contents in the fuel burned during the source tests required in conditions 13 and 14 of this permit.

F5221225

Exhibit B5

**NATIONAL EMISSIONS STANDARDS FOR
HAZARDOUS AIR POLLUTION PERMIT FOR DSSI**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

APR 11 1989

4APT-AC

Mr. James T. McVey
Executive Vice President
Diversified Scientific Services, Inc.
P.O. Box 863
Kingston, Tennessee 37763

Subject: NESHAP Construction/Operation Approval Letter for Diversified Scientific Services, Incorporated (DSSI) Scintillation Fluid Burning System

Dear Mr. McVey:

In accordance with the provisions of 40 CFR 61, we have reviewed information submitted on June 16, 1988; October 13, 1988; January 20, 1989; and March 9, 1989, to determine the ability of the referenced facility to comply with the NESHAP radionuclide emission standards promulgated at 40 CFR 61, Subpart I. Based upon this review, approval is hereby given for the construction and operation of the scintillation fluid burning system at DSSI's Kingston site, based upon the regulations currently in effect, i.e. those promulgated at 50 FR 5195 on February 5, 1985.

Although approval for the burner is being issued on the basis of it being able to comply with the regulations currently in effect, you should be aware of the potential impact that recently proposed revisions to 40 CFR 61, Subpart I may have on your facility. For your information, we have enclosed the full text of the revisions proposed on March 7, 1989. The portions of the package which are of primary importance to you are the regulations in §61.100 to §61.108 and the compliance demonstration procedures outlined in Appendices B, D and E. One important fact you should keep in mind is that EPA is proposing dose standards that correspond to four different control approaches and that, based upon which of the four approaches is chosen at promulgation, the dose standard for NRC-licensed facilities could range anywhere from 0.03 mrem/yr to 10 mrem/yr effective dose equivalent (ede).

The dose standards for the proposed regulations are calculated differently than the whole body and critical organ dose standards in the current regulation. Since the 10 mrem/yr ede standard under approaches A and B in the proposed regulation is roughly equivalent to the 25 mrem/yr whole body standard in the existing regulation, we would not anticipate you having any trouble complying with the emission standard in approaches A or B if the burner is constructed and operated as described in the Application. If the standards in approaches C or D are chosen for the promulgated standards, then you would either have to reduce the quantity of radionuclides processed in the burner or would have to install additional pollution controls. Since construction of the burner will begin after proposal of the Subpart I revisions, the burner will be considered to be a new source under the new regulations also. Therefore, the revised standards

will apply to your facility upon promulgation and you will not be eligible for a compliance waiver under the provisions of 40 CFR §61.10 and §61.11.

In addition to the provisions of 40 CFR 61, Subparts A and I, approval to construct and operate the burner is also contingent upon compliance with the following additional terms and conditions:

1. The facility shall be designed, constructed, and operated as described in the NESHAP application dated October 13, 1988, and additional information dated June 16, 1988; January 20, 1989; and March 9, 1989, (hereinafter referred to as the Application), unless superseded by a more stringent condition below.
2. All flue gas from the burner shall pass through an air pollution control system consisting of a prefilter, HEPA filter, and carbon adsorber.
3. The Applicant shall maintain a log of all radioactive receipts for the facility and shall include the following information in the log: the date of shipment, the radionuclide inventory at the time of shipment, the date of receipt, verification results when conducted, and comparison of the verification results with the reported inventory. A separate log shall be maintained and shall include a cumulative inventory for each radionuclide received and treated. In addition, the Applicant shall notify the Agency whenever the cumulative inventory of radionuclides in the waste burned in a calendar year exceeds either of the quantities listed below:
 - a. Total tritium and carbon-14 :22.5 Ci
 - b. Total for radionuclides other than tritium and carbon-14 :1.5 Ci
4. For any radionuclide not listed in the Application, the Applicant shall establish a Maximum Acceptable Quantity (MAQ) of the radionuclide to be treated each year if that quantity is likely to exceed a minimum amount. The minimum amount is based on the quantity of the radionuclide that would result in a calculated effective dose equivalent of 1/100 of the NESHAP standards. Upon receiving a request for disposal of a radionuclide for which a MAQ has not been established and which is greater than the minimum amount, the Applicant shall perform a dose equivalent assessment for the radionuclide prior to establishing a MAQ. The dose equivalent assessment shall be conducted using the same techniques and data bases as outlined in the Application, with the exception that assessment must be performed only at the previously established point of maximum impact. Concurrent with the notification to the generator of waste acceptance, and prior to receiving the first shipment for a new radionuclide, which exceeds the minimum amount, the Applicant shall notify the Agency in writing of its intent to receive a waste containing a radionuclide not originally analyzed in the Application. The notification shall include the MAQ established for the new radionuclide, the

composition of the waste, the expected quantity of waste to be received annually, and the estimated dose resulting from treating the waste in combination with all other doses associated with activities at DSSI's Kingston site.

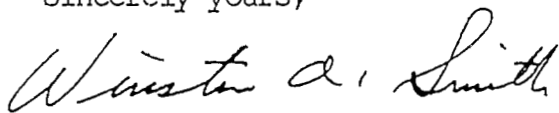
5. The exhaust stack shall be provided with testing facilities as follows:
 - a. Sampling ports adequate for test methods applicable to such facility.
 - b. Safe sampling platform(s).
 - c. Safe access to sampling platform(s).
 - d. Utilities for sampling and testing equipment.
6. Procedures in §61.107 of the Subpart I revisions to be promulgated on or about August 31, 1989, shall be used for determining radionuclide emissions from the burner. If the burner starts up prior to August 31, 1989, procedures in the version of §61.107 proposed on March 7, 1989, shall be used to determine the burner's radionuclide emissions in the period of time between proposal and promulgation of the revisions. The Applicant shall maintain a record of all radionuclides emitted and shall notify the Agency whenever the cumulative emissions during a calendar year exceed either of the quantities listed below:
 - a. Total tritium and carbon-14 :22.5 Ci
 - b. Total for radionuclides other than tritium and carbon-14 :1.5 Ci
7. Within 90 days after the effective date of the Subpart I revisions to be promulgated on or about August 31, 1989, the Applicant shall notify the Agency as to whether or not the burner will be capable of complying with the offsite dose standard in the promulgated regulation. Details of this notification appear at 40 CFR 61.10.
8. Thirty (30) days after the end of each calendar quarter, the Applicant shall report the radionuclide release rate from the facility (expressed as curies per month for each radionuclide emitted) during each of the previous three months.
9. No condition presented herein precludes the Applicant from adherence to additional or more stringent conditions or requirements of any other Federal, State, or local approval or permit.
10. Failure to comply with the conditions of this approval may result in revocation of the approval and/or enforcement action by the Agency.
11. At all times, including periods of startup, shutdown, and malfunction, the burner shall be maintained and operated in a manner consistent with good air pollution control practices for minimizing emissions.

12. All notifications, reports, and correspondence shall be submitted to the Chief, Air Compliance Branch, Air, Pesticides and Toxics Management Division, U.S. EPA, 345 Courtland Street, Atlanta, Georgia 30365 with copies to the Director, Tennessee Division of Radiological Health; and Director, Tennessee Division of Air Pollution Control.

This approval is granted solely under Section 112 of the Clean Air Act and implementing regulations at 40 C.F.R. 61 and in no way affects approvals under other Federal or State regulatory authorities.

If you have questions concerning this approval, please contact me at 404/347-3043.

Sincerely yours,



Winston A. Smith, Director
Air, Pesticides and Toxics
Management Division

Enclosure

cc: Mr. Harold Hodges, Director
Division of Air Pollution Control
Tennessee Department of Public Health
Customs House, 4th Floor
701 Broadway
Nashville, Tennessee 37219-5403

Mr. Michael Mobley, Director
Division of Radiological Health
Tennessee Department of Health and Environment
150 9th Avenue, North
TERRA Building
Nashville, Tennessee 37219-5404

Exhibit B6

HAZARDOUS WASTES ACCEPTABLE FOR RECEIPT AT DSSI

**CHEMICALS ACCEPTABLE FOR RECEIPT AT
DIVERSIFIED SCIENTIFIC SERVICES, INC.**

<u>Chemical Name</u>	<u>Hazardous Waste Code Number</u>
1,1 Dichloroethane	U076
1,2 Dichloroethane	U077
1,1,1-Trichloroethane	F001/F002/U226
1,1,2-Trichloroethane	F002/U227
1,1,2-Trichlorotrifluoroethane	F001/F002
1,2-Dichlorobenzene	F002/U070
1,4-Dioxane	U108/D001
2-butenal	U053
2-ethoxyethanol (ethylene glycol monethyl ether)	F005/U359
2-Nitropropane	F005/U171
Acetaldehyde	U001
Acetone	F003/U002
Acetonitrile	U003
Acetophenone	U004
Aniline	U012
Acrylamide	U007
Benzene	F005/U019
n-Butyl alcohol	F003/U031
Carbon Disulfide	F005/P002
Carbon Tetrachloride	F001/U211
Chlorobenzene	F002/U037
Chloroform	U044
m-Cresol	F004/U052
o-Cresol	F004/U052
p-Cresol	F004/U052
Cresylic acid	F004
Cumene	U055
Cyclohexane	U056
Cyclohexanone	F003/U057
o-Dichlorobenzene	F002/U070
m-Dichlorobenzene	F002/U071
p-Dichlorobenzene	F002/U072
Dichloroisopropyl ether	U027
Dipropylamine	U110
Ethanol	D001
Ethyl Acetate	F003/U112
Ethyl Benzene	F003
Ethyl Ether	F003/U117
Ethylene glycol	D001
Formaldehyde	U122
Furan	U124

<u>Chemical Name</u>	<u>Hazardous Waste Code Number</u>
Heptane	D001
Hexane	D001
Isoamyl alcohol	D001
Isobutyl alcohol	F005/U140
Isoctane/2,2,4-Trimethylpentane	D001
Methane, bromo-	U029
Methane, dibromo	U068
Methane, trichloro	U044
Methanol	F003/U154
Methylene Chloride	F002/U080
Methyl Ethyl Ketone	F005/U159
Methyl Isobutyl Ketone	F003/U161
Methyl Pyrrole	D001
Mineral Spirits	D001
Naphthalene	U165
Nitrobenzene	F004/U169
Nonane	D001
Octane	D001
Propanol	D001
Pentane	D001
Propane, 1,2-dichloro	U083
2-Propenal	P003
Propylene glycol	D001
Pyridine	F005/P075/U196
Tetrahydrofuran	U213
1,1,2,2-Tetrachloroethane	U209
1,1,1,2-Tetrachloroethane	U208
Tetrachloroethylene	F001/F002/U210
Toluene	F005/U220/D001
o-Toluidine	D001/U328
m-Toluidine	D001
p-Toluidine	D001/U353
Trichloroethylene	F001/F002/U228
Trichlorofluoromethane	F002/U121
Trichloromethane	U044/D001
m-Xylene	F003/U239/D001
o-Xylene	F003/U239/D001
p-Xylene	F003/U239/D001
Unlisted Ignitable Waste	D001
Spent Solvents	F001
Spent Solvents	F002
Spent Solvents	F003
Spent Solvents	F004
Spent Solvents	F005
Arsenic	D004
Barium	D005

<u>Chemical Name</u>	<u>Hazardous Waste Code Number</u>
Cadmium	D006
Chromium	D007
Lead	D008
Mercury	D009
Selenium	D010
Silver	D011
Endrin	D012
Lindane	D013
Methoxychlor	D014
Toxaphene	D015
2,4-D	D016
2,4,5-TP (silvex)	D017
Benzene	D018
Carbon Tetrachloride	D019
Chlordane	D020
Chlorobenzene	D021
Chloroform	D022
o-Cresol	D023
m-Cresol	D024
p-Cresol	D025
Cresol	D026
1,4-Dichlorobenzene	D027
1,2-Dichloroethane	D028
1,1-Dichloroethylene	D029
2,4-Dinitrotoluene	D030
Heptachlor (and its epoxide)	D031
Hexachlorobenzene	D032
Hexachlorobutadiene	D033
Hexachloroethane	D034
Methyl ethyl Ketone	D035
Nitrobenzene	D036
Pentachlorophenol	D037
Pyridine	D038
Tetrachloroethylene	D039
Trichloroethylene	D040
2,4,5-Trichlorophenol	D041
2,4,6-Trichlorophenol	D042
Vinyl Chloride	D043

Exhibit C1

LIST OF PERMITS, LICENSES, OR AUTHORIZATIONS PERTAINING TO NSSI

List of permits, licenses, or authorizations pertaining to NSSI				
Type	Number	Issue date	Expiration date	Issued by
Radioactive Materials License	L01811	None specified	April 30, 1995	Texas Department of Health Bureau of Radiation Control 1100 West 49th Street Austin, TX 78756-3189
TSD Type B - Hazardous Waste Permit	HW-50269	January 29, 1992	October 3, 2000	Texas Water Commission P. O. Box 13087 Capitol Station 1700 North Congress Avenue Austin, TX 78711-3087
EPA Generators Number	TXD 98 256 0294	None specified	None specified	Texas Water Commission P. O. Box 13087 Capitol Station 1700 North Congress Avenue Austin, TX 78711-3807

Exhibit C2

HAZARDOUS WASTE PERMIT FOR NSSI

Texas Water Commission

INTEROFFICE MEMORANDUM

TO : Texas Water Commission DATE: 8-2-90
THRU : Michael E. Field, Chief Hearings Examiner
FROM : *ckf for* Carl X. Forrester, Senior Administrative Law Judge
SUBJECT: NSSI/Recovery Services, Inc.; Proposed Permit No. HW-50269

NSSI/Recovery Services, Inc. of Houston, Texas, has applied to the Texas Water Commission for proposed Permit No. HW-50269 which would authorize NSSI/Recovery Services, Inc., to operate a commercial hazardous waste storage and processing facility in east Harris County, Texas. The facility will store and process wastes in 20 tanks totaling 58,530 gallons capacity and four container storage areas totaling 114,620 gallons capacity. The facility site is located on eighteen city lots in a mixed commercial, residential and industrial area located at 5711 Etheridge, Houston, Texas. The site is located in Segment No. 1006 of the San Jacinto River Basin.

Carl X. Forrester, Attorney, a Commission Senior Administrative Law Judge (ALJ), conducted an adjudicative public hearing in Houston, Texas on May 15, 1990 after proper notice of the hearing was given pursuant to Section 26.022 of the Texas Water Code, as amended, and Section 361.082 of the Texas Health and Safety Code.

The ALJ designated the following as parties to the hearing: the applicant (represented by Tom Buckle, Attorney); the Commission's Executive Director (represented by Bob Renbarger, Attorney); the Commission's Public Interest Counsel (represented by Leslie Sachanowicz, Attorney); Treatment One/SET Environmental, Inc. (represented by Keith Hopson, Attorney); and Harris County (represented by David Melasky, Attorney). Six employees of the City of Houston were present but did not seek party status and offered no public comment.

Prior to the start of the trial of the issues, the parties negotiated a complete settlement of the issues. As a result of that settlement, the attached proposed permit has been modified to include the regulatory provisions regarding air pollution control which were agreed to by the parties. As a result of that agreement and inclusion of the air pollution control provisions in the permit, the protests of this application have been dropped and this application has become uncontested.

Memorandum to the Commission
NSSI/Recovery Services, Inc.

The ALJ believes that it is in the public interest and the interest of this agency to support negotiated settlements of parties to contested hearings whenever possible. Therefore, the Judge recommends that the Commission approve the application and issue the attached Permit No. HW-50269 which includes the agreed provisions of the parties.

Because the application is now uncontested, no Order with Findings of Fact and Conclusions of Law contained therein has been prepared.

Claire P. Crenson for

Carl X. Forrester, Attorney
Senior Administrative Law Judge

TEXAS WATER COMMISSION

B. J. Wynne, III, Chairman
John O. Houchins, Commissioner
John E. Birdwell, Commissioner



John J. Vay, General Counsel
Michael E. Field, Chief Hearings Examiner
Brenda W. Foster, Chief Clerk

October 11, 1990

Allen Beinke, Executive Director

RE: NSSI/RECOVERY SERVICES, INC.; Permit No. HW-50269

Dear Permittee:

Enclosed is a copy of:

X 1. Permit for a wastewater treatment facility issued pursuant to Chapter 26 of the Texas Water Code. In order that you may comply with monitoring requirements of your permit, self-reporting forms and instructions will be forwarded to you from the Water Quality Division at an early date. If your facility is not yet operating, please use the attached Notification of Completion of Facilities form to advise this agency and our district office of the completion or placement in operation of proposed facilities in accordance with the special provision incorporated into the permit.

2. Amended permit for a wastewater treatment facility issued pursuant to Chapter 26 of the Texas Water Code. Please continue using the self-reporting forms you have on hand until new forms are forwarded by the Water Quality Division. If your facility is not yet operating, please use the attached Notification of Completion of Facilities form to advise this agency and our district office of the completion or placement in operation of proposed facilities in accordance with the special provision incorporated into the permit.

3. Renewal of a permit for a wastewater treatment facility issued pursuant to Chapter 26 of the Texas Water Code. If your facility is not yet operating, please use the attached Notification of Completion of Facilities form to advise this agency and our district office of the completion or placement in operation of proposed facilities in accordance with the special provision incorporated into the permit.

4. Permit for a hazardous or solid waste facility issued pursuant to Art. 4477-7, Texas Revised Civil Statutes. Your attention is directed to Commission Rule 335.5 which may be applicable to your facility.

5. Permit or amended permit for a waste disposal well or an injection well issued pursuant to Chapter 27 of the Texas Water Code. In accordance with the Texas Water Code, you must file a copy of the permit with the city and county health authorities.

If there are any questions concerning this permit, please let us know.

A handwritten signature in cursive script that reads "Brenda W. Foster".

Brenda W. Foster, Chief Clerk

cc w/enclosures

TWC District No. 7

G-61



ACKNOWLEDGEMENT OF NOTIFICATION
OF HAZARDOUS WASTE ACTIVITY

DEC 27 1988

This is to acknowledge that you have filed a Notification of Hazardous Waste Activity for the installation located at the address shown in the box below to comply with Section 3010 of the Resource Conservation and Recovery Act (RCRA). Your EPA Identification Number for that installation appears in the box below. The EPA Identification Number must be included on all shipping manifests for transporting hazardous wastes; on all Annual Reports that generators of hazardous waste, and owners and operators of hazardous waste treatment, storage and disposal facilities must file with EPA; on all applications for a Federal Hazardous Waste Permit; and other hazardous waste management reports and documents required under Subtitle C of RCRA.

EPA ID NUMBER

TXD982560294

NSSI/RECOVERY SVCS INC.
ROBERT GALLAGHER

P.O. BOX 34042

HOUSTON, TX. 77234

INSTALLATION ADDRESS

5709 ETHERIDGE

HOUSTON, TX. 77087

John Hall, Chairman
Pam Reed, Commissioner
Peggy Garner, Commissioner



FEB 3 1992

TEXAS WATER COMMISSION

PROTECTING TEXANS' HEALTH AND SAFETY BY PREVENTING AND REDUCING POLLUTION

JAN 31 1992

NSSI/Recovery Services, Inc.
Atten: Robert D. Gallagher, Pres
P. O. Box 34042
Houston, Texas 77234

RE: NSSI/RECOVERY SERVICES, INC.
CLASS 2 MOD; Permit HW50269

Enclosed is a copy of:

() a Permit for a wastewater treatment facility issued pursuant to Chapter 26 of the Texas Water Code. In order that you may comply with monitoring requirements for your waste discharge permit, self-reporting forms and instructions will be forwarded to you from the Water Quality Division at an early date. If you have these forms on hand please continue using them until new forms are sent. (NOTE: If your permit is for disposal only, self-reporting forms are not applicable.) If your facility is not yet operating, please use the attached "Report of Progress of Construction of Wastewater Treatment Facilities" form. This form will advise this agency and our district office of the completion or placement in operation of proposed facilities in accordance with the special provision incorporated into the permit.

(✓) a Permit for a hazardous or solid waste facility issued pursuant to Art. 4477-7 Texas Revised Civil Statutes. Your attention is directed to Commission Rule 335.5 which may be applicable to your facility.

() a Permit for a waste disposal well or an injection well issued pursuant to Chapter 27 of the Texas Water Code. In accordance with the Texas Water Code, you must file a copy of the permit with the city and county health authorities.

If there are any questions concerning this permit, please let us know.

Sincerely,

A handwritten signature in cursive script that reads "Gloria A. Vasquez".

Gloria A. Vasquez, Chief Clerk
GAV:sp

Enclosure

cc w/enclosure:

TWC District Office 7

G-63

**TEXAS WATER COMMISSION
FIELD OPERATIONS DIVISION
AREA OFFICES**

DISTRICT 1

3918 Canyon Drive
Amarillo, Texas 79109-4996
806/353-9251 (TEX-AN 8-862-0071)
Don Manning, District Manager

DISTRICT 2

5303 50th Street, Suite 306-4
Lubbock, Texas 79414-1875
806/796-7092 (TEX-AN 8-840-1067)
Larry L. Smith, District Manager

DISTRICT 3

14000 Woodway Drive
Waco, Texas 76712-3193
817/751-0335 (TEX-AN 8-820-1465)
Larry Fergusson, District Manager

DISTRICT 4

1019 N. Duncanville Rd.
Duncanville, Texas 75116-2201
214/298-6171 (TEX-AN 8-831-5650)
Charles D. Gill, District Manager

DISTRICT 5

2916 Teague Drive
Tyler, Texas 75701-3734
903/595-5466 (TEX-AN 8-831-5256)
John Witherspoon, District Manager

DISTRICT 6

4820 Ward Drive
Beaumont, Texas 77705-0328
409/842-9413 (TEX-AN 8-850-1383)
Keith Anderson, District Manager

DISTRICT 7

5144 East Sam Houston Parkway North
Houston, Texas 77015
713/457-5191 (TEX-AN 8-730-0200 or 0300)
William F. Bowles, District Manager

TWC LABORATORY

5144 East Sam Houston Parkway North
Houston, Texas 77015
713/457-5229 (TEX-AN 8-730-0200 or 0300)
Jim Busceme, Lab Manager

DISTRICT 8

140 Heimer Road, Suite 360
San Antonio, Texas 78232-5042
512/490-3096 (TEX-AN 8-820-1308
and 820-1314)
Billy Boggs, District Manager

DISTRICT 9

102 Canyon Road
San Angelo, Texas 76904
915/655-9479 or 655-1336
Kenneth W. Krueger, District Manager

DISTRICT 10

2626 J.B. Shepperd Parkway Blvd.
Bldg. B-129
Odessa, Texas 79761
915/362-6997 (TEX-AN 8-840-1432)
William F. Lockey, District Manager

DISTRICT 11

813 E. Pike Blvd.
Weslaco, Texas 78596-4935
512/968-3165 (TEX-AN 8-820-1826)
John Sturgis, District Manager

DISTRICT 12

4410 Dillon Lane, Suite 47
Corpus Christi, Texas 78415-5326
512/851-8484 (TEX-AN 8-820-1682)
Chip Volz, District Manager

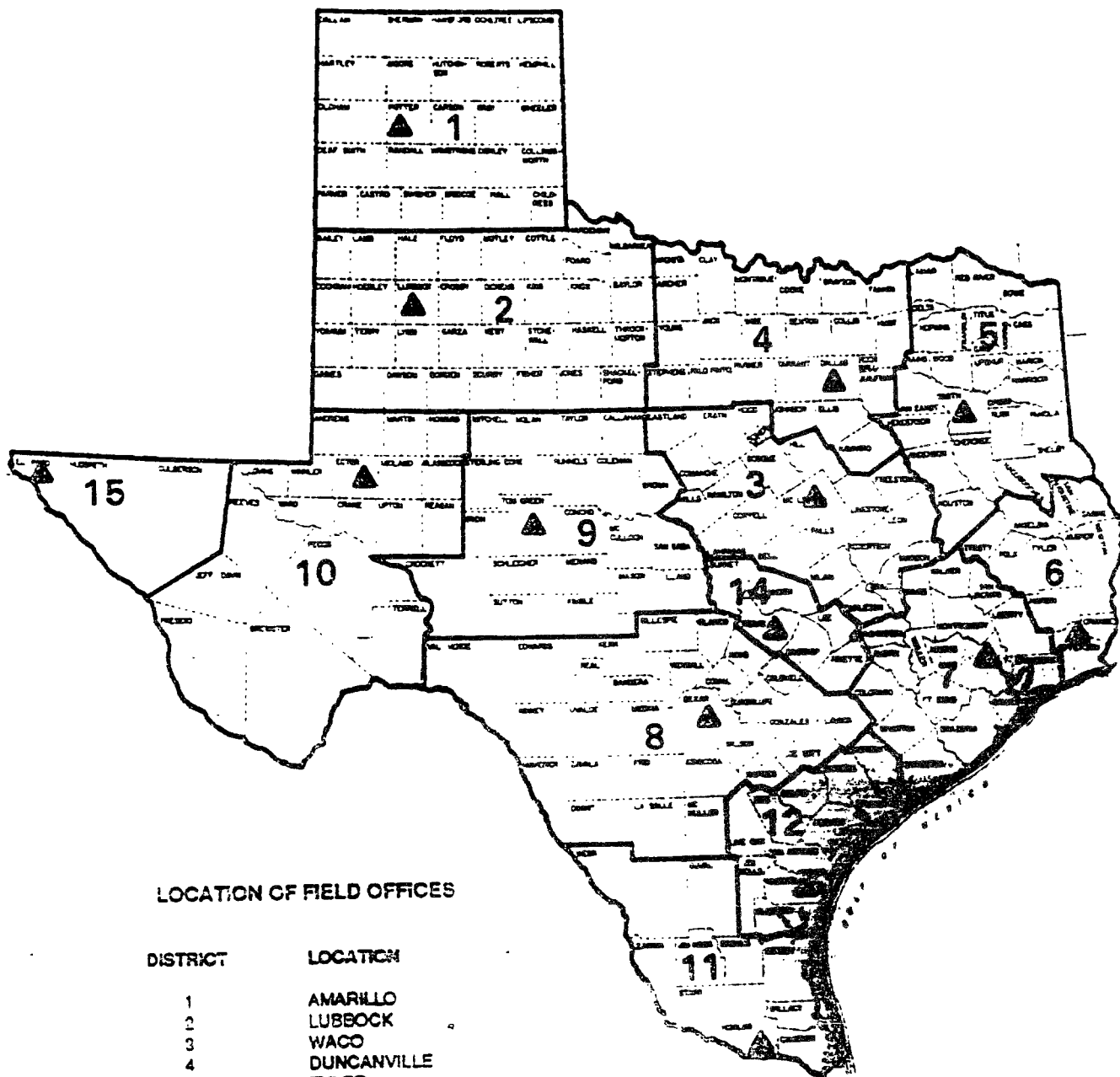
DISTRICT 14

1700 South Lamar, Bldg. 1, No. 101
Austin, Texas 78704-3360
512/463-7803 (TEX-AN 8-255-7803)
W. John Young, District Manager

DISTRICT 15

7500 Viscount Blvd., Suite 147
El Paso, Texas 79925
915/778-9634 (TEX-AN 8-846-8183)
Hector Villa, District Manager

*Note: The addresses and telephone numbers above are current as of 09/30/91, however, they are subject to change.
Telephone ahead to confirm location if planning a visit to one of the Commission's field offices.*



LOCATION OF FIELD OFFICES

DISTRICT	LOCATION
1	AMARILLO
2	LUBBOCK
3	WACO
4	DUNCANVILLE
5	TYLER
6	BEAUMONT
7	HOUSTON
8	SAN ANTONIO
9	SAN ANGELO
10	ODESSA
11	WESLACO
12	CORPUS CHRISTI
14	AUSTIN
15	EL PASO
TWC LAB	HOUSTON



TEXAS WATER COMMISSION
Stephen F. Austin State Office Building
Austin, Texas

**PERMIT FOR INDUSTRIAL
SOLID WASTE MANAGEMENT SITE**
Issued under provisions of TEX.
HEALTH & SAFETY CODE ANN.
Chapter 361 (Vernon)

PERMIT NO. HW-50269
REGISTRATION NO. 38669
EPA I.D. NO. TXD 982560294

This permit supersedes and replaces
Permit No. HW-50269 approved October 3, 1990.

Name of Permittee: NSSI/Recovery Services, Inc.
P.O. Box 34042
Houston, Texas 77234

Site Owner: Robert D. Gallagher
c/o NSSI/Recovery Services, Inc.
P.O. Box 34042
Houston, Texas 77234

Registered Agent for Service: Robert D. Gallagher
c/o NSSI/Recovery Services, Inc.
P.O. Box 34042
Houston, Texas 77234

Classification of Site: Hazardous waste storage and processing,
commercial

The permittee is authorized to store and process wastes in accordance with limitations, requirements and other conditions set forth herein. This permit is granted subject to the rules of the Commission and other Orders of the Commission and laws of the State of Texas. Nothing in this permit exempts the permittee from compliance with the applicable rules and regulations of the Texas Air Control Board.

This permit will be valid until cancelled, amended or revoked by the Commission. Authorization to store and process wastes shall expire midnight, October 3, 2000.

The provisions in this permit stem from both State and Federal authority. Those provisions marked with an asterisk (*) stem from Federal authority and will implement the applicable requirements of HSWA which are not yet authorized to the State of Texas.

APPROVED, ISSUED, AND EFFECTIVE this 29th day of January 1992

ATTEST: Muriel J. [Signature]

[Signature]
For the Commission

Table of Contents

NSSI/Recovery Services, Inc.

Section

- I. Size and Location of Facility
- II. Units and Operations Authorized
 - A. Wastes Authorized
 - B. Units Authorized
 - C. Processing Functions Authorized
- III. Facility Design, Construction, and Operation
 - A. General Design, Construction, and Operation
 - B. General Operational Requirements
 - C. Tank Design, Construction, and Operation Requirements
 - D. Container Storage Area Design, Construction and Operation Requirements
- IV. Closure
 - A. General Closure Requirements
 - B. Hazardous Waste Management Unit Closure Requirements
- V. Standard Permit Conditions
- VI. Incorporated Regulatory Requirements
- VII. Incorporated Application Materials
- VIII. Standard Permit Conditions Applicable to Off-site Facilities
- IX. Standard Permit Conditions Applicable to Marketers of Hazardous Waste Fuel
- X. RCRA Facility Investigation
- XI. Air Quality Provisions

NAME: NSSI/Recovery Services, Inc.

I. Size and Location of Facility

- A. The hazardous waste management facility is located on 18 city lots in a mixed commercial, residential and industrial area at 5711 Etheridge, Houston, Harris County, Texas. The location is described as being in watershed area 1006 of the San Jacinto River Basin (North Latitude 29° 40'32", West Longitude 95°18'24").
- B. The legal description and site plan submitted in the application for Permit No. HW-50269 are hereby made parts of this permit as Attachments A and B.

II. Units and Operations Authorized

A. Wastes Authorized:

The permittee is authorized to manage hazardous and industrial solid waste listed in the application and described herein, subject to the limitations provided herein.

Wastes include those generated at this facility and from off-site sources. Any hazardous waste may be accepted from a household source.

Hazardous and industrial solid wastes authorized to be managed under this permit are limited as follows:

1. Hazard Code Group Codes (as prescribed by U. S. Environmental Protection Agency regulations) in effect upon date of permit approval:

<u>x</u> Ignitable (I)	<u>x</u> Acute Hazardous Waste (H)
<u>x</u> Toxic (T)	<u>x</u> Toxicity Characteristic (E)
<u>x</u> Corrosive (C)	<u>x</u> Reactive (R)

2. <u>Waste Descriptions</u>	TWC	
	<u>Waste Class</u>	<u>Hazard Codes</u>
a. Spent Halogenated Solvents	IH	T,E
b. Spent Non-Halogenated Solvents	IH	I,T,E
c. Acetone	IH	I
d. Benzene	IH	I,T,E
e. n-Butyl Alcohol	IH	I
f. Cumene	IH	I
g. Cyclohexane	IH	I
h. Cyclohexanone	IH	I
i. 1,4 Dioxane	IH	T
j. Ethyl Acetate	IH	I
k. Ethyl Ether	IH	I
l. Formaldehyde	IH	T

NAME: NSSI/Recovery Services, Inc.

[II.A.2.]

<u>Waste Descriptions</u>	<u>TWC Waste Class</u>	<u>Hazard Codes</u>
m. Isobutanol	IH	I, T
n. Methanol	IH	I
o. Methyl Ethyl Ketone	IH	I, T, E
p. Methyl Isobutyl Ketone	IH	I
q. Naphthalene	IH	T
r. Pyridene	IH	T, E
s. Toluene	IH	T
t. Xylene	IH	I
u. Empty Containers	I	
v. Misc. Chemical-contaminated Materials	IH	I, C, R, E, H, T
w. Labpacks and Containers to be Consolidated into labpacks	IH	I, C, R, E, H, T
x. Oil and Solvents	IH	I, T, E
y. Paint Sludge	IH	I, C, E, H, T
z. Paint Sludge containing Chlorinated Solvents	IH	I, C, E, H, T
aa. Cyanides	IH	R, T
bb. Wastewater containing Organics, Metals, and Oil	IH	E, H, T
cc. Organic Liquids	IH	I, E, H, T
dd. Sludge from Oxidation/Reduction	IH	I, C, E, H, T
ee. Solids from Solvent Still	IH	I, E, H, T
ff. Stabilized Waste	IH	E, H, T
gg. Sludge from Blending/Separation/ Storage Tanks	IH	I, C, E, H, T
hh. Waste Carbon Adsorption Media and Solids	IH	I, E, H, T
ii. Waste Ion Exchange Media and Solids	IH	C, E, H, T
jj. Filter Solids and Media	IH	I, C, E, H, T
kk. Hazardous Solid Material	IH	I, C, E, H, T, R
ll. Consolidated Hazardous Liquids	IH	I, C, R, E, H, T
mm. Consolidated Hazardous Solids	IH	I, C, R, E, H, T
nn. Blended Hazardous Waste Fuel	IH	I, C, E, R
oo. Compressed Hazardous Waste Gas	IH	I, C, E, R, H, T

3. Mixed Radioactive and Hazardous Wastes

So long as the permittee shall hold and abide the restrictions of a radioactive materials license from the Texas Department of Health, radioactive or nuclear waste materials (i.e., waste material which emits ionizing radiation spontaneously) which also fit the waste descriptions in Provision II.A.2. above may be received from off-site and managed in accordance with the provisions of this permit.

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[II.A.]

4. Prohibited Wastes and Waste Limitations:

Explosive material as defined by the Department of Transportation (DOT) under 49 CFR 173.

5. Prior to accepting any additional wastes with chemical characteristics similar to those authorized by Provision II.A.2., the permittee shall satisfy the following requirements:

- a. Notify the Executive Director;
- b. Provide a characterization of the waste demonstrating its similarity;
- c. Submit, upon request of the Executive Director, sufficient information to ascertain similarity of the waste material. If the Executive Director determines the material is not similar, the permittee must obtain a permit amendment before accepting the waste.
- d. Receive written response from the Executive Director informing the permittee that the material is similar to those materials authorized by Provision II.A.2. and that a permit amendment or modification is not required in order to receive the waste.

B. Units Authorized:

The permittee is authorized to operate the following units for storage and processing subject to the limitations contained herein. All waste management activities subject to permitting are to be confined to the following units:

1. Tank, stainless steel, above-grade, capacity 3,000 gallons, identified as Tank No. 1 in the application (NOR No. 07), for storage and processing of wastes described in Provisions II.A.2.a.-t., x., cc., ll., and nn.
2. Tank, stainless steel, above-grade, capacity 3,000 gallons, identified as Tank No. 2 in the application (NOR No. 07), for storage and processing of wastes described in Provisions II.A.2.a.-t., x., cc., ll., and nn.
3. Tank, stainless steel, above-grade, capacity 3,000 gallons, identified as Tank No. 3 in the application (NOR No. 07), for storage and processing of wastes described in Provisions II.A.2.a.-t., x., cc., ll., and nn.

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[II.B.]

4. Tank, stainless steel, above-grade, capacity 3,000 gallons, identified as Tank No. 4 in the application (NOR No. 07), for storage and processing of wastes described in Provisions II.A.2.a.-t., x., cc., ll., and nn.
5. Tank, stainless steel, above-grade, capacity 1,700 gallons, identified as Tank No. 5 in the application (NOR No. 07), for storage and processing of wastes described in Provisions II.A.2.a.-t., x., cc., ll., and nn.
6. Tank, stainless steel, above-grade, capacity 1,700 gallons, identified as Tank No. 6 in the application (NOR No. 07), for storage and processing of wastes described in Provisions II.A.2.a.-t., x., cc., ll., and nn.
7. Tank, stainless steel, above-grade, capacity 1,100 gallons, identified as Tank No. 7 in the application (NOR No. 07), for storage and processing of wastes described in Provisions II.A.2.a.-t., x., cc., ll., and nn.
8. Tank, stainless steel, above-grade, capacity 1,100 gallons, identified as Tank No. 8 in the application (NOR No. 07), for storage and processing of wastes described in Provisions II.A.2.a.-t., x., cc., ll., and nn.
9. Tank, stainless steel, above-grade, capacity 1,100 gallons, identified as Tank No. 9 in the application (NOR No. 07), for storage and processing of wastes described in Provisions II.A.2.a.-t., x., cc., ll., and nn.
10. Tank, stainless steel, above-grade, capacity 900 gallons, identified as Tank No. 10 in the application (NOR No. 07), for storage and processing of wastes described in Provisions II.A.2.a.-t., x., cc., ll., and nn.
11. Tank, stainless steel, above-grade, capacity 3,000 gallons, identified as Tank No. 11 in the application (NOR No. 07), for storage and processing of wastes described in Provisions II.A.2.a.-t., x., cc., ll., and nn.
12. Tank, stainless steel, above-grade, capacity 1,700 gallons, identified as Tank No. 12 in the application (NOR No. 07), for storage and processing of wastes described in Provisions II.A.2.a.-t., x., cc., ll., and nn.

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[II.B.]

13. Tank, stainless steel, above-grade, capacity 10,000 gallons, identified as Tank No. 13 in the application (NOR No. 07), for storage and processing of wastes described in Provisions II.A.2.bb.
14. Tank, stainless steel, above-grade, capacity 10,000 gallons, identified as Tank No. 14 in the application (NOR No. 07), for storage and processing of wastes described in Provisions II.A.2.a.-t., x., cc., ll., and nn.
15. Tank, stainless steel, above-grade, capacity 10,000 gallons, identified as Tank No. 15 in the application (NOR No. 07), for storage and processing of wastes described in Provisions II.A.2.bb.
16. Tank, stainless steel, above-grade, capacity 1,300 gallons, identified as Acid-Base Neutralization Tank in the application (NOR No. 03), for storage and processing of all authorized acids and bases.
17. Tank, carbon steel, glass-lined, above-grade, capacity 650 gallons, identified as the 600-gallon Oxidation-Reduction Tank in the application (NOR No. 04), for processing of all authorized wastes.
18. Tank, carbon steel, glass-lined, above-grade, capacity 360 gallons, identified as the 400-gallon Oxidation-Reduction Tank in the application (NOR No. 04), for processing of all authorized wastes.
19. Tank, stainless steel, above-grade, capacity 960 gallons, identified as Grinder Tank No. 1 in the application (NOR No. 16), for storage and processing of wastes described in Provisions II.A.2.a.-t., x., cc., and ll.
20. Tank, stainless steel, above-grade, capacity 960 gallons, identified as Grinder Tank No. 2 in the application (NOR No. 16), for storage and processing of wastes described in Provisions II.A.2.a.-t., x., cc., and ll.
21. Container storage area, closed on all sides, maximum capacity 79,860 gallons, identified as the Building 1 Container Storage Area in the application (NOR No. 08), for storage and processing of wastes described in Provisions II.A.2.a.-nn.

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[II.B.]

22. Container storage area, closed on all sides, maximum capacity 29,700 gallons, identified as the Building 2 Container Storage Area in the application (NOR No. 17), for storage and processing of all authorized wastes which are not reactive and not ignitable.
23. Container storage area, containing two "explosive" storage buildings, each closed on all sides, maximum capacity 500 gallons, identified as the Reactive Container Storage Area in the application (NOR No. 12), for storage of all authorized reactive wastes.
24. Container storage area, closed on all sides, maximum capacity 33,215 gallons, identified as the Building 3 Container Storage Area in the application (NOR No. ____), for storage of all authorized wastes.

C. Functions Authorized:

The permittee is authorized to perform the following functions, subject to the limitations contained herein:

1. Blending of wastes to form a fuel for use off-site;
2. Consolidation of waste containers into lab packs;
3. Breaking down lab packs for re-consolidation for off-site disposal or on-site processing;
4. Neutralization, oxidation, reduction, and other chemical reactions to render wastes less hazardous or more suitable for off-site disposal or on-site processing;
5. Recycling of solvents;
6. Cleaning of duffel or particulate solids, empty drums, and equipment;
7. Centrifugation, filtration, and ion exchange in portable equipment within an authorized container storage area;
8. Solidification or stabilization in containers within an authorized container storage area;
9. Shredding of containers for recovery of contents;
10. Consolidation of miscellaneous compatible hazardous wastes;

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[II.C.]

11. Chemical and/or mechanical treatment to accomplish separation, settling, or clarification in portable equipment within an authorized container storage area;
 12. Removal of hazardous constituents by absorption on solid media in portable equipment within an authorized container storage area;
 13. Drying of solids to meet off-site disposal criteria for release of water only; and
 14. Recovery of waste chemicals and other material for re-use or resale.
- D. Authorization to operate these units is contingent upon maintenance of financial assurance pursuant to Provision IV.A.1. and maintenance of liability coverage in compliance with the requirements of, and in a form outlined in, 40 CFR Part 264, Subpart H. Authorization to begin operation of new units is contingent upon compliance with Provisions IV.A.1. and V.C. The permittee may not store or process waste unless compliant with all financial assurance requirements and liability requirements, to include all related financial assurance instruments and liability coverage instruments being in full force and effect.
- E. The units and operational methods authorized are limited to those described both herein and by the application and related plans and specifications which were included in the permit application submittals dated November 4, 1988; June 29, 1989; August 24, 1989, March 15, 1991 and September 5, 1991. Prior to constructing or operating any unit in a manner which differs from either the related plans and specifications or the limitations of this permit, the permittee is required to
1. Notify the TWC and submit plans and specifications for the proposed changes; and
 2. Receive written authorization of the Executive Director for such changes, if the Executive Director determines that a permit amendment or modification is not required by TWC rules.
- F. Any proposed unit changes, addition of units, or expansion in capacity which has not been addressed by the terms of this permit must be authorized in accordance with TWC permit amendment or modification rules.

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III. Facility Design, Construction, and Operation

A. General Design, Construction, and Certification Requirements:

1. Facility design, construction, and operation must comply with this permit, Texas Water Commission (TWC) Rules, and be in accordance with the plans and specifications for design, construction and operation approved herein. All plans submitted with the application dated November 4, 1988; June 29, 1989; August 24, 1989; March 15, 1991 and September 5, 1991 are approved, subject to the terms of this permit and any other orders of the Texas Water Commission which are hereby incorporated by reference and made a part of this permit.
2. The entire hazardous waste management facility shall be designed, constructed, operated, and maintained to prevent the release and/or migration of any hazardous waste beyond the zone of engineering control and to prevent inundation of and discharge from the areas surrounding the facility components. Each receipt, storage, and processing area, including unloading areas, shall be provided with a secondary containment system which will meet the requirements of 40 CFR 264.193 and which will collect spills and incident precipitation in such a manner as to:
 - a. Preclude the release from the system of any collected spills, leaks, or precipitation, except as provided in Provision III.B.2. This requirement shall be met by, at a minimum, providing a base and sides which are free of cracks or gaps and are sufficiently impervious to contain leaks, spills, or precipitation until the collected material is removed, and providing curbs or sides designed to withstand a full hydrostatic head;
 - b. Prevent washout of any hazardous waste by a 100-year flood;
 - c. Prevent run-on into the system from non-storage and processing areas; and
 - d. Have sufficient capacity to contain the volume of the largest tank or 10% of the total tank and/or container free liquid capacity, whichever is greater, plus (for uncovered areas) the volume of rainwater which would be collected by the 25-year, 24-hour rainfall event (9.8 in.).
3. All authorized units shall be clearly identified as numbered in Provision II.B. At a minimum, the container areas are to have signs, and the tanks are to have painted labels indicating "TWC PERMIT UNIT NO. (from Provision II.B.)," (for example, Tank 1 shall be labelled "TWC PERMIT UNIT NO. 1").

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[III.A.]

4. Within seven months of October 3, 1990, or 60 days prior to use, the permittee shall construct and submit to the Executive Director and to the TWC District 7 Office as-built drawings and certifications prepared in accordance with Provision V.C. for Tanks 1-15, two Grinder Tanks, the Building 2 Container Storage Area, and the Building 3 Container Storage Area.

B. General Operational Requirements:

1. Incompatible wastes shall not be commingled in any storage or processing facility component, unless the permittee takes precautions to prevent the adverse reactions identified in 40 CFR 264.17(b). The permittee shall comply with the requirements of 40 CFR 264.17(a) for ignitable wastes.
2. Collected spills, leaks, clean-up residues, and contaminated rainfall runoff including stormwater from all waste management areas shall be removed within 24 hours after the spillage and/or rainfall event by a method(s) in Provision III.B.4.
3. The permittee shall manage all wastes within the facility unit in a manner in which particulate emissions of waste to the air meet Texas Air Control Board and Texas Water Commission requirements.
4. All contaminated water as identified by Provision III.B.5., Provision IV.B.2., and Provision IV.B.3. shall be managed by the following method(s):
 - a. Removal to an on-site, authorized industrial solid waste unit;
 - b. Discharge to the sanitary sewer, after satisfying all requirements of the City of Houston for such discharge;
 - c. Discharge in accordance with a washwater discharge permit and/or;
 - d. Removal off-site to an authorized industrial solid waste management facility.
5. The permittee shall ensure that any equipment which has come in contact with hazardous waste has been decontaminated prior to exiting the unit. At a minimum, all contaminated equipment shall be washed sufficiently to remove waste residues. All wash water generated shall be collected and disposed of in accordance with Provision III.B.4.

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{III.B.}

6. The annual site activity report required by Provision V.F. shall be submitted to the TWC Central Office and District 7 Office by January 25 of each year for the preceding year's activities. This annual report shall include, at a minimum, the following information:
 - a. All information and records required by 31 Texas Administrative Code (TAC) 335.154;
 - b. Volume of fuel-from-waste shipped;
 - c. Amounts of non-fuel materials received as waste and sold without processing;
 - d. Volume of all wastes stored at the facility unit authorized in Provision II.B.; and
 - e. Summary of the annual cost estimate adjustments for facility closure.
7. The permittee shall ensure that all waste analyses utilized for waste identification or verification have been performed in accordance with methods specified in the current editions of "Test Methods for Chemical Analysis of Water and Wastes" or "Test Methods for the Evaluation of Solid Waste" (SW-846) or other methods which are officially approved by the EPA. The permittee shall utilize only laboratories which follow a quality control, quality assurance program conforming to the program specified in "Test Methods for the Evaluation of Solid Waste" (SW-846).
8. The permittee shall develop and use inspection forms which include all units to be inspected and a list of all items to be inspected at each unit. Any remedial actions taken in response to unit inspections and the date of the remediation shall be included on the inspection forms.
9. The permittee shall ensure that all facility personnel handling hazardous waste successfully complete a program of classroom instruction and on-the-job training that teaches them to perform their duties in a way which ensures the facility's compliance with this permit. The permittee shall comply with 40 CFR 264.16.
10. All tanks, sumps, pumps, fire and spill control equipment, decontamination equipment, and all other equipment and structures authorized or required by this permit shall be maintained in good functional condition.

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[III.B.]

11. The permittee shall comply with the security requirements of 40 CFR 264.14.

C. Tank Design, Construction, and Operation Requirements:

The permittee shall comply with the following minimum requirements for the tanks authorized by Provision II.B.:

The tanks shall be constructed and operated in such a way as to comply with the standards presented in 40 CFR 264.192-264.199.

D. Container Storage Area Design, Construction and Operation Requirements:

1. The container storage areas shall be constructed and operated in such a way as to comply with the standards presented in 40 CFR 264.171 - 264-178.
2. In addition, within 30 days of amendment issuance by the TWC, the permittee shall comply with the following minimum requirements for the container storage areas authorized by Provision II.B.
 - a. The permittee shall provide a nominal 30" aisle spacing between double rows of drums in adjacent drum storage rows.
 - b. Drums of 55 gallons or more capacity shall not be stacked more than three high;
 - c. Pallets shall be used between layers of stacked drums; and
 - d. Drums of incompatible wastes shall be separated by an impermeable barrier.

IV. Closure

A. General Closure Requirements:

1. The permittee shall provide financial assurance for closure in accordance with the form outlined in 40 CFR Part 264, Subpart H in an initial amount not less than \$692,091 in 1988 dollars plus an additional \$164,105 in 1991 dollars. This financial assurance amount shall be adjusted annually as specified in Provision IV.A.2.a. Financial assurance shall be secured and maintained in compliance with Commission regulations on hazardous waste financial requirements (31 TAC Section 335.152 and 40 CFR Part 264, Subpart H).
2. The permittee shall submit to the Executive Director upon request such information as may be necessary to determine the adequacy of financial assurance.

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[IV.A.2.]

- a. Within 60 days prior to the anniversary date of the financial assurance documents, or within 30 days after the firm's fiscal year for firms using the financial test or corporate guarantee, the facility's closure cost estimate shall be updated for inflation and submitted to the Executive Director. The adjustment shall be made by recalculating costs in current dollars, or by using an inflation factor derived from the most recent Implicit Price Deflator. Pursuant to 31 TAC 335.178, the cost estimate for closure shall be based on off-site disposal during closure of all waste and waste residue for all units not required to close as landfills.
 - b. If changes in the closure plan will increase the cost of closure, then the cost estimate shall be revised within 30 days after approval of the plan by the Executive Director. The revised cost shall also be adjusted as specified in Provision IV.A.2.a.
3. Facility closure shall commence:
- a. Upon direction of the Texas Water Commission or the Executive Director for violation of the permit, TWC Rules, or State Statutes;
 - b. Upon suspension, cancellation, or revocation of the terms and conditions of this permit concerning the authorization to store, process, or dispose of waste materials;
 - c. Upon abandonment of the site;
 - d. Upon direction of the Executive Director for failure to secure and maintain an adequate bond or other financial assurance as required in Provision IV.A.1.; or
 - e. When necessary to comply with Provision VII.C.
4. The permittee shall submit a written request for a permit amendment or modification to authorize a change in operating plans, unit design, or the approved closure plan in accordance with the time frames of Provisions IV.A.5.a.-d. The written request shall include a copy of the amended closure plan for approval by the Executive Director. The permittee shall submit a written request for a permit amendment or modification to authorize a change in the approved closure plan whenever:
- a. Changes in operating plans or facility design affect the approved closure plan;

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[IV.A.4.]

- b. There is a change in the expected year of final closure, if applicable;
 - c. In conducting partial or final closure activities, unexpected events require amendment of the approved closure plan; or
 - d. Requested by the Executive Director under the conditions described in Provisions IV.A.4.a.-c.
5. The permittee shall submit a written request for a permit amendment or modification:
- a. At least 60 days prior to the proposed change in unit design or operation which will affect the approved closure plan;
 - b. No later than 60 days after an unexpected event has occurred which has affected the closure plan;
 - c. No later than 30 days after an unexpected event has occurred, if the unexpected event occurs during the partial or final closure period; or
 - d. Within 60 days of the Executive Director's request pursuant to Provision IV.A.4.d., or within 30 days if the change in facility conditions occurs during partial or final closure.
6. The permittee shall notify the Executive Director in writing at least 45 days prior to the date on which he expects to begin final closure of the facility. A copy of the notice shall be submitted to the Texas Water Commission (TWC) District 7 Office.
7. Within 60 days of the completion of final closure, the permittee shall submit to the Executive Director by registered mail, with a copy to the TWC District 7 Office, a certification that the hazardous waste management unit or facility, as applicable, has been closed in accordance with the specifications in the approved closure plan and the terms of this permit. The certification shall be signed by the permittee and by an independent registered professional engineer. Additional documentation supporting the independent registered professional engineer's certification shall be furnished to the Executive Director upon request until he releases the permittee from the financial assurance requirements for closure under 40 CFR 264.143(i).

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[IV.]

B. Hazardous Waste Management Unit Closure Requirements:

1. All tanks, pumps, piping, and any other equipment or structures which have come in contact with waste shall either be decontaminated by removing all waste or disposed of at an authorized facility.
2. All wash water generated during decontamination activities shall be collected and disposed of in accordance with Provision III.B.4.
3. All hard-surfaced areas within the hazardous waste management unit areas shall be decontaminated and the wash water generated shall be collected and disposed of in accordance with Provision III.B.4.
4. Verification of decontamination shall be performed by analyzing wash water for the waste constituents which have been most recently in contact with the particular item being decontaminated.

V. Standard Permit Conditions

The permittee has a duty to comply with the Standard Permit Conditions under Title 31 TAC 305.125. Moreover, the permittee has a duty to comply with the following permit conditions:

- A. In order to continue a permitted activity after the expiration date of the permit the permittee shall submit a new permit application at least 180 days before the expiration date of the effective permit, unless permission for a later date has been granted by the Executive Director. Authorization to continue such activity will terminate upon the effective denial of said application.
- B. The permittee need not comply with the conditions of this permit to the extent and for the duration such noncompliance is authorized in an emergency order issued by the Commission.
- C. For a new unit, the permittee shall not commence storage, processing or disposal of solid waste; and for a unit being modified, the permittee shall not process, store or dispose of solid waste in the modified portion of the unit, until the following requirements have been satisfied:
 1. The permittee has notified the local TWC District Office and submitted to the Executive Director by certified mail or hand delivery a letter signed by the permittee and a Texas registered professional engineer certifying that the facility has been constructed or modified in compliance with the permit. Required certification shall be in the following form:

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[V.C.1.]

This is to certify that the construction of the following facility components authorized or required by TWC Permit No. HW-50269 has been completed, and that construction of said facility component has been performed in accordance with and in compliance with the design and construction specifications of Permit No. HW-50269. (Description of facility units and components with reference to applicable permit provisions), and

2. The Executive Director has inspected the modified or newly constructed unit and finds it is in compliance with the conditions of the permit; or within 15 days of submitting the letter required by Provision V.C.1., the permittee has not received notice from the Executive Director of an intent to inspect, prior inspection is waived and the permittee may commence processing, storage or disposal of solid waste.
- D. The following details shall be included as information which must be reported orally within 24 hours pursuant to Title 31 TAC 305.125(9):
1. Information concerning release of any solid waste that may cause an endangerment to public drinking water supplies.
 2. Any information of a release or discharge of solid waste, or of a fire or explosion from a facility unit, which could threaten the environment or human health outside the facility. The description of the occurrence and its cause shall include the following information:
 - a. name, address, and telephone number of the owner or operator;
 - b. name, address, and telephone number of the facility;
 - c. date, time, and type of incident;
 - d. name and quantity of material(s) involved;
 - e. the extent of injuries, if any;
 - f. an assessment of actual or potential hazards to the environment and human health outside the facility, where this is applicable; and
 - g. estimated quantity and disposition of recovered material that resulted from the incident.

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[V.]

- E. The Executive Director may waive the five-day written notice requirement as specified in Title 31 TAC 305.125(9) in favor of a written report submitted to the Commission within 15 days of the time the permittee becomes aware of the noncompliance or condition.
- F. An annual report must be submitted covering facility activities during the previous calendar year.
- G. Emissions from this facility must not cause or contribute to a condition of "air pollution" as defined in Section 382.003 of the Texas Clean Air Act or violate Section 382.085 of the Texas Clean Air Act. If the Executive Director of the Texas Air Control Board determines that such condition or violation occurs, the permittee shall implement additional abatement measures as necessary to control or prevent the condition or violation.
- H. The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.
- I. The permittee shall notify the Commission in writing within 10 days of discovery of any release to the environment of hazardous waste or hazardous constituents that may have occurred from any solid waste management unit at the facility regardless of when the release occurred or may have occurred, and regardless of when waste was placed in any unit. Release of hazardous waste or hazardous waste constituents from any solid waste management unit regardless of when waste was placed in that unit or when the release occurred, will constitute grounds for (1) a major permit amendment or modification pursuant to the Texas Solid Waste Disposal Act, TEXAS HEALTH AND SAFETY CODE, Chapter 361 (Vernon), as necessary to incorporate into the permit appropriate corrective action (2) the adoption by the Commission of a ground water compliance plan; or (3) other action deemed necessary by the Commission. Pursuant to such permit amendment or modification, ground-water compliance plan, or other order or action, the permittee shall then take timely corrective action for such releases.

Within forty-five (45) days of becoming aware of a solid waste management unit (SWMU) not previously addressed in the RCRA Facility Assessment, the permittee shall submit a preliminary assessment. The preliminary assessment shall include information regarding the SWMU to determine if there has been or is currently a release of hazardous waste or hazardous constituents from the unit. Based upon this information, the Executive Director may modify this permit as necessary.

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[V.]

*If the release involves off-site contamination, the Director of the Hazardous Waste Division of Region VI of the U.S. Environmental Protection Agency must be included in all of the required activities specified in this provision.

J. Waste Minimization

The permittee shall certify annually by October 1 for the previous year ending August 31, that the permittee

1. has a program in place to reduce the volume and toxicity of all hazardous wastes which are generated by the permittee's facility operation to the degree determined to be economically practicable;
2. that the proposed method of treatment, storage, or disposal is that practicable method currently available to the permittee which minimizes the present and future threat to human health and the environment. The waste minimization certification is to be included in the operating records; and
3. has surveyed its plant processes and other sources of hazardous waste and has identified those that are listed on the TWC Annual Waste Summary. Within 210 days of the effective date of this permit, the permittee shall submit to the Executive Director a list of hazardous wastes generated, together with a list of Waste Minimization Projects ("WMPs") that it has determined through its waste minimization review program can be implemented within the next five years.

Annually thereafter, the permittee shall submit to the Executive Director, on or before the anniversary date of the permittee's first listing of WMPs, a report setting forth the following information:

- a. The status of each listed WMP as of the date of the report including the quantity of each hazardous waste and the percentage of reduction together with a projection concerning the expected work or resources that can be devoted to each listed WMP during the next twelve months;
- b. If any WMP has been deleted from the list previously submitted, the reason for such deletion; and
- c. A listing of any new or changed WMP that permittee's review program has developed since the last annual report.

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[V.J.3.c.]

The Executive Director may require the permittee to submit a more detailed Status report for a specific WMP if it is unclear to the Executive Director the reasons the permittee has taken a particular action in regard to such WMP.

- K. The permittee shall comply with 40 CFR 266.23(b).
- L. The permittee is required to meet all performance standards in this permit, regardless of whether the permit also contains a specific design or other requirement relating to the performance standard.
- * M. The permittee shall comply with the land disposal restrictions as found in 40 CFR 268 (Fed. Reg. November 7, 1986; June 4, 1987; July 8, 1987; August 17, 1988; June 23, 1989; June 1, 1990 and any subsequent applicable promulgations). Requirements include modifying the permittee's waste analysis plan, as necessary, to include analyses to determine compliance with applicable treatment standards or prohibition levels, pursuant to 40 CFR 268.7(c) and 264.13(a).

The following Provision V.N. is not a part of the TWC permit. It is included as part of the EPA permit, and is to be enforced only by EPA.

- ** N. The Permittee must comply with the requirements of 40 CFR 264 Subpart AA and Subpart BB, as applicable. Within 90 days of the effective date of this modification, the Permittee shall submit to the Director of the Hazardous waste Management Division, EPA, Region 6, a report which must contain, at the minimum, the following information:
 - 1. An equipment list which includes all of the information required under Part 264.1064 (b)(1) for equipment that contains or contacts hazardous waste with organic concentrations of at least 10 percent by weight, and a list of all process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations managing hazardous waste with organic concentrations of at least 10 percent by weight.
 - 2. For the process vents listed above, the amount of vent emissions in lb/hr or kg/hr, and in lb/yr or kg/yr.
 - 3. If emissions in Provision V.N.2. of this section exceed the emission limits cited in Part 264.1032 (a)(1), the report must detail the manner in which compliance will be obtained, i.e., by the reduction of total organic emissions to the limits in Part 264.1032 (a)(1), or reduction by means of a control device per Part 264.1032 (a)(2).

NAME: NSSI/Recovery Services, Inc.

[V.N.]

4. If a closed vent system and control device is installed to comply with the requirements in Part 264.1032 (a)(2), provide the following:
 - a. An implementation schedule that includes dates by which the closed vent system and control device will be installed and in operation (Part 264.1033 (a)(2)).
 - b. The type of control device under Part 264.1033 to be installed (e.g., vapor recovery, flare, etc...).
5. If the Permittee feels any of the requirements of Provision V.N., or of 40 CFR Part 264 Subparts AA and BB, are not applicable to this facility, the Permittee must provide justification for this decision as part of the report.

VI. Incorporated Regulatory Requirements

- A. The following Texas Water Commission regulations are hereby made provisions and conditions of this permit. Issuance of this permit with incorporated rules in no way exempts the permittee from compliance with any other applicable state statute and/or Commission Rule.
 1. 31 Texas Administrative Code (TAC) Chapter 335 Subchapter A;
 2. 31 TAC Chapter 335 Subchapter B;
 3. 31 TAC Chapter 335.152;
 4. 31 TAC Chapters 335.153-335.155;
 5. 31 TAC Chapters 335.177-335.179; and
 6. 31 TAC Chapters 335.201-335.205.
- B. To the extent applicable to the activities authorized by this permit, the following provisions of 40 Code of Federal Regulations Part 264, adopted by reference by 31 TAC Section 335.152, are hereby made provisions and conditions of this permit:
 1. Subpart B -- General Facility Standards;
 2. Subpart C -- Preparedness and Prevention;
 3. Subpart D -- Contingency Plan and Emergency Procedures;
 4. Subpart E -- Manifest System, Recordkeeping, and Reporting;

NAME: NSSI/Recovery Services, Inc.

[VI.B.]

5. Subpart G -- Closure and Post-closure;
6. Subpart H -- Financial Requirements;
7. Subpart I -- Use and Management of Containers; and
8. Subpart J -- Tank Systems.

VII. Incorporated Application Materials

The permittee shall maintain the following documents at the facility and make them available for inspection by regulatory personnel.

A. Contingency Plan

The permittee shall follow the contingency plan, developed in accordance with 40 CFR Part 264, Subpart D, dated November 1, 1989, and revised July 1, 1989; August 10, 1989 and August 2, 1991, which is hereby approved subject to the terms of this permit and any other orders of the Texas Water Commission. The contingency plan is hereby incorporated into this permit by reference as if set out fully herein. Any and all revisions to the plan shall become provisions and conditions of this permit upon the date of approval by the Commission.

B. Inspection Schedule

The permittee shall follow the inspection schedule, developed in accordance with 40 CFR 264.15, dated November 1, 1989, and revised July 1, 1989 and August 2, 1991, which is hereby approved subject to the terms of this permit and any other orders of the Texas Water Commission. The inspection schedule is hereby incorporated into this permit by reference as if set out fully herein. Any and all revisions to the schedule shall become provisions and conditions of this permit upon the date of approval by the Commission.

C. Closure Plan

Facility closure shall be completed in accordance with the requirements of 31 TAC Section 335.152 and 40 CFR Part 264 Subpart G and the closure plan dated November 1, 1989, and revised July 1, 1989; August 10, 1989 and August 2, 1991, which is hereby approved subject to the terms of this permit and any other orders of the Texas Water Commission. The closure plan is hereby incorporated into this permit by reference as if set out fully herein. Any and all revisions to the plan shall become provisions and conditions of the permit upon the date of approval by the Commission.

NAME: NSSI/Recovery Services, Inc.

[VII.]

D. Waste Analysis Plan

The permittee shall follow the waste analysis plan developed in accordance with 40 CFR 264.13, dated November 1, 1989, and revised July 1, 1989; August 10, 1989 and August 2, 1991, which is hereby approved subject to the terms of this permit and any other orders of the Texas Water Commission. The waste analysis plan is hereby incorporated into this permit by reference as if set out fully herein. Any and all revisions to the plan shall become provisions and conditions of this permit upon the date of approval by the Commission.

VIII. Standard Permit Conditions Applicable to Off-site Facilities

The following reports shall be submitted:

- A. Manifest discrepancy report: If a significant discrepancy in a manifest is discovered, the permittee must attempt to reconcile the discrepancy. If not resolved within 15 days, the permittee must submit a letter report including a copy of the manifest to the Executive Director.
- B. Unmanifested waste report: Must be submitted to the Executive Director within 15 days of receipt of unmanifested waste.
- C. Monthly summary: A monthly summary must be submitted covering facility activities during the previous month, including product produced from waste and shipped.

IX. Standard Permit Conditions Applicable to Marketers of Hazardous Waste Fuel

- A. Before engaging in the marketing of hazardous waste fuel, the permittee shall notify the U.S. Environmental Protection Agency (EPA) of hazardous waste fuel marketing activities.
- B. A copy of the permittee's notice to EPA shall be maintained in the operating record for three years after all fuel marketing activities have been stopped.
- C. Permittee shall not ship hazardous waste fuel without a written and signed notice from the recipient in the operating record that:
 - 1. The burner or marketer has notified EPA and identified his waste-as-fuel activities; and
 - 2. If the recipient is a burner, the burner will burn the hazardous waste fuel only in an industrial furnace or boiler identified in 31 TAC 335.222(b).

NAME: NSSI/Recovery Services, Inc.

[IX.]

- D. A copy of the notice from each recipient to the permittee shall be maintained in the operating record for three years after the last shipment to the recipient.
- E. Dioxins, F020, F021, F023, F026, F027, and F028 shall not be blended into fuel.
- F. Prior to selecting any waste stream for use in a fuel blend, a representative sample of the waste stream shall be collected and analyzed for heat content using ASTM D240 or D2015. The sample shall not be considered appropriate for fuel blending and the waste stream from which the sample was collected shall not be used in a fuel blend, unless the sample exhibits a total heat content of at least 3,000 BTU/lb. No waste stream with a total PCB content of 50 ppm or greater shall be used in a fuel blend.
- G. Following final blending, i.e. before sale, a representative sample of the resultant hazardous waste mixture shall be collected and analyzed for heat content using ASTM D240 or D2015 and PCB content using SW846-8080. The resultant hazardous waste mixture shall not be labelled or otherwise represented as fuel unless the mixture exhibits the following criteria:
 - a. Total heat content of at least 3,000 BTU/lb; and
 - b. Total PCB content less than 50 ppm.
- H. All sampling and analyses that are performed in order to ensure compliance with Provisions IX.E. and IX.G. above shall be maintained in the facility operating records.
- X. This Section is not used.

XI. Air Quality Provisions

- A. Issuance of this permit does not relieve the permittee from compliance with the Texas Clean Air Act (TCAA) as amended (TEXAS HEALTH AND SAFETY CODE, Chapter 382) or any applicable Rule, Regulation or Order of the Texas Air Control Board (TACB).
- B. All representations with regard to construction plans and operating procedures in the permit application are conditions upon which this permit is issued. The permittee shall not vary from such representations if the change will result in a significant increase in the discharge of any air contaminant, unless prior notification is made to the Texas Water Commission (TWC). The TACB Central Office in Austin and the Harris County Pollution Control Department (HPCPD) shall be notified at the time of such notification to the TWC.

NAME: NSSI/Recovery Services, Inc.

{XI.}

- C. The appropriate regional office of the TACB and HCPCD shall be notified prior to the start of any governmentally required air monitoring of the facility units authorized by this permit in such a manner that a representative of the TACB and HCPCD may be present during monitoring.
- D. The facility units covered by this permit shall not be operated unless all associated air pollution abatement equipment which is required to be in place is maintained in good working order and is operating properly during normal facility operations.
- E. A copy of this permit shall be kept at the plant site and made available at the request of personnel from the TACB, TWC, or HCPCD.
- F. The permittee shall maintain a duplicate record of a current inventory of materials regulated under this permit at an off-site location.
- G. Containers of hazardous waste or solid waste shall be opened only for the purposes authorized by the terms and conditions of this permit.
- H. The permittee shall install a carbon adsorption system which provides the following:
 - 1. The carbon adsorption system shall at a minimum consist of a carbon absorber with the sampling point at its exit. The absorber exit shall be monitored on a weekly basis to determine breakthrough of organic compounds. If breakthrough is determined to have occurred as specified in Provisions XI.H.2.-3., the absorber shall be replaced by a second absorber or the absorber shall be regenerated immediately.
 - 2. Breakthrough of organic compounds shall be determined by use of a photoionization detector equipped with lamps having an energy level of at least 11.7 eV or an equivalent detector.
 - 3. Breakthrough shall be considered to have occurred when monitoring indicates a concentration of 100 ppm of total hydrocarbons present in the gas stream at the sampling point.
 - 4. Disposal of spent carbon canisters shall not cause or create air emissions.
 - 5. Engineering details and operating conditions of the final carbon bed design shall be provided to the HCPCD prior to use of the system.
- I. Ducts, hoses, and connections in the tank truck liquid transfer systems shall be properly maintained to insure leak free conditions.

NAME: NSSI/Recovery Services, Inc.

[XI.]

- J. Within 60 days of October 3, 1990, or sixty (60) days prior to use, whichever is later, the Permittee shall provide to HCPCD diagrams of the scrubber systems, including all manifolds, ductwork, and dampers.
- K. All storage tanks in Building No. 2 containing volatile organic liquid shall be vented to the condenser carbon absorber system.
- L. Storage tank and process vessels in Building No. 1 shall be vented to caustic scrubber prior to the condenser/carbon absorber system, unless there are no particulates or acid gases in the waste stream.
- M. Vapors from tank trucks containing VOC shall be vented into the carbon absorber unit.
- N. Vapors from tank trucks with acid liquids shall be vented to a caustic scrubber system.
- O. The caustic scrubber shall meet the following criteria:
1. The caustic scrubber will be designed by the Permittee.
 2. The scrubbing liquid to be used is no less than 0.1% caustic.
 3. The minimum pH which will be maintained in each scrubber is 10.
 4. The type of packing will be provided after the unit is designed.
- P. The handling of hydrochloric acid (25%) shall not exceed 10% of the total acid handled at this facility. Handling of hydrochloric acid (35%) shall not exceed 7.5% of the total acid handled at this facility.
- Q. Sulfuric acids (98%) shall not exceed 13% of the total acid handled at this facility.
- R. The maximum emission rates from the following sources are:
1. The scrubber
 - (1) VOC: 2.9913 pounds per hour or one ton per year
 - (2) Acid gases: 0.8452 pounds per hour or 0.17 ton per year
 2. The absorber
 - (1) VOC: 0.4759 pounds per hour or 0.25 ton per year
 - (2) Acid gases: 0.2527 pounds per hour or 0.30 ton per year

NAME: NSSI/Recovery Services, Inc.

XII. Monitoring of Commercial Hazardous Waste Management Facility Operations

- A. Within the first year after commission action on the modification the facility owner or operator shall provide notice to affected persons of intent to have an independent annual environmental audit of the facility performed. The notice shall be issued in accordance with the following procedure.
1. The notice shall state the names of at least three independent inspectors nominated by the facility owner or operator to perform the environmental audit and shall be published in the newspaper of the largest general circulation that is published in the county in which the facility is located. The facility owner or operator shall not nominate an inspector who is employed or who has been employed by the facility.
 2. The notice shall announce a meeting time and place, to be located near the facility location, be held within 15 days of the published notice in order for the facility to receive comments from and allow for participation by interested affected persons in the selection of the independent inspector. The interested affected persons may either agree to one of the nominated independent inspector or nominate other independent inspector if they do not approve of the nominee list. The selection of the independent inspector shall be agreed to by the facility owner or operator and the interested affected persons no later than 30 days from the date of the meeting. The name of the selected independent inspector shall be submitted to the commission no later than 15 days from the date of selection for the commission's approval. The commission shall approve the independent inspector after it has determined that the independent inspector has the necessary expertise to perform the audit and does not have a conflict of interest with any of the parties involved in the inspector selection.
 3. The published notice may not be smaller than 96.8 square centimeters or 15 square inches with the shortest dimension at least 7.6 centimeters or three inches and shall contain at a minimum, the following information:
 - a. the facility owner's or operator's name;
 - b. the location of the facility;
 - c. the facility permit number;
 - d. the time and date of the scheduled annual environmental audit;
 - e. names of at least three nominated independent inspectors;

NAME: NSSI/Recovery Services, Inc.

[XII.A.3.]

- f. the date and time and location of the selection meeting; and
 - g. the name and telephone number of a facility contact person.
- 4. The facility owner or operator shall provide a copy of the published notice to local jurisdictions where the facility is located.
- 5. The facility owner or operator shall provide the commission with an affidavit including a newspaper tear sheet of the published notice and sworn statement of the editor or publisher certifying that the notice was given as required by this section. Acceptance of the affidavit creates a rebuttable presumption that the applicant has complied with this requirements.
- B. If the facility owner or operator and interested affected persons cannot agree on the selection of an independent inspector within the time frame specified in Provision XII.A.2. the commission shall select an independent inspector. The commission's selection, however, shall not be limited to either the facility owner or operator's nominee list or the interested affected persons' nominee list. The commission shall take steps necessary to assure that the independent inspector or entity selected to perform the audit has the necessary expertise to perform the audit, is not a business competitor of the facility, and does not have a conflict of interest with any of the parties involved in the inspector selection.
- C. The facility owner or operator shall pay the cost of notice required to be provided.
- D. The facility owner operator shall be responsible for the costs of an independent annual environmental audit. The facility owner or operator shall also maintain responsibility for procuring the selected independent inspector. The commission shall not be a party to such procurement nor warrant the workmanship of the selected inspector.
- E. The facility owner or operator shall submit the results of an independent annual environmental audit in writing to the Executive Director.
- F. The scope of the independent annual environmental audit may encompass any and all provisions of environmental permits required for the facility and all relevant statutes and regulations regarding the management of the facility.
- G. The facility is not required to perform the annual independent environmental audit if the facility does not receive any comments from affected persons. If the facility performs the independent audit despite lack of response, the facility must obtain the commission's approval of the selected independent inspector prior to the audit.

NAME: NSSI/Recovery Services, Inc.

[XII.]

- H. An affected person is any person who is a resident of a county of any country adjacent or contiguous to the county in which a hazardous waste management facility is to be located including any person who is doing business or owns land in the county or adjacent or contiguous county and any local government. Such person affected shall also demonstrate to the commission that he has suffered or will suffer actual injury or economic damage.

Attachments

- A -- Legal Description
B -- Site Plan

LEGEND

- 1 ACID BASE NEUTRALIZATION UNIT
- 2 SOLVENT RECOVERY AREA
- 3 CHEMICAL OXIDATION/REDUCTION AREA
- 4 BUILDING NO. 1 CONTAINER STORAGE AREA
- 5 BUILDING NO. 2 CONTAINER STORAGE AREA
- 6 SUBSTITUTION MEDIA CONSOLIDATION AREA
- 7 MECHANICAL SEPARATION AREA
- 8 UNDERGROUND WASTEWATER TANKS (CLOSED)
- 9 SOLIDS CLEARING AREA
- 10 CHEMICAL STABILIZATION AREA
- 11 BUILDING NO. 3 CONTAINER STORAGE AREA
- 12 BLENDING/SEPARATION/STORAGE TANKS
- 13 WASTEWATER TANKS
- 14 REFRIGERATED STORAGE
- 15 OUTDOOR CONTAINER STORAGE AREA (CLOSED)
- 16 LAB HALL AREA (1 THROUGH VI)
- 17 REACTIVE CONTAINER STORAGE AREA

LEGEND

- 2" FIRE HOSE
- ⊙ 20 LB FIRE EXTINGUISHER
- FIRE ALARM
- Ⓛ TELEPHONE
- Ⓜ ABSORBENT
- Ⓝ NEUTRALIZER
- Ⓟ SODA
- Ⓡ SAFETY SHOWER
- Ⓢ EYEWASH

0 40
1" = 40'
N

ENTRANCE

Figure II-2-1
General Facility Description

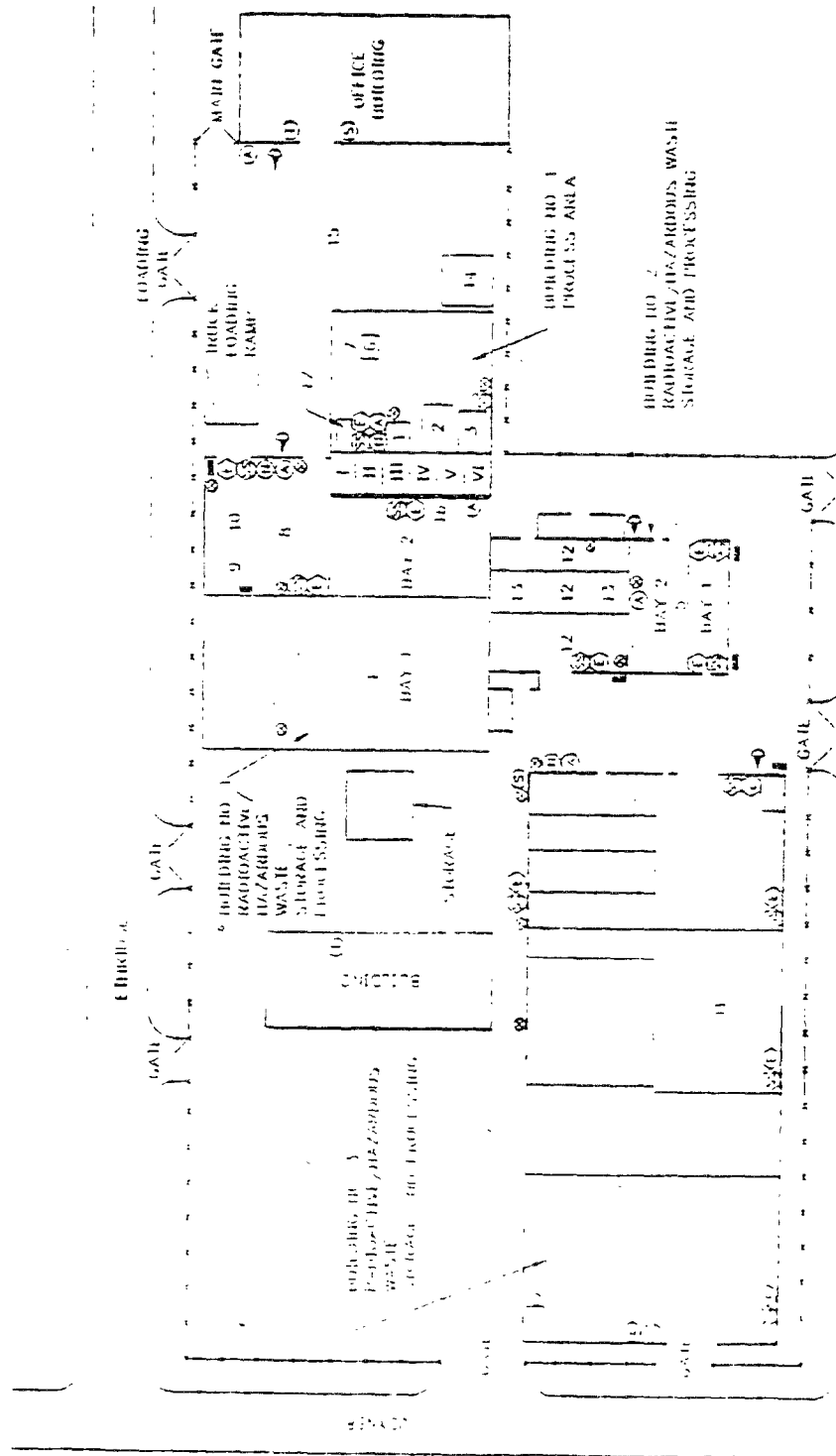


Exhibit C3

RCRA PART B PERMIT FOR NSSI



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VI
1445 ROSS AVENUE, SUITE 1200
DALLAS, TEXAS 75202

April 17, 1989

APR 20 1989

Ms. Janet Greenberg
Project Manager
NSSI/Recovery Services, Inc. Project Team
ENSR Consulting and Engineering
3000 Richmond Avenue
Houston, Texas 77098

Dear Ms. Greenberg:

Your March 28, 1989, letter to Mr. Lee Haze of this Agency, requested some information on permitting requirements for facilities that handle radioactive mixed waste. It is our understanding that your facility has both Part A and B applications on file with the Texas Water Commission.

The State of Texas, through the Texas Water Commission, has applied for approval of some State regulatory revisions. The Environmental Protection Agency has proposed in a February 3, 1989, notice in the Federal Register (54 FR 5500) the approval of these revisions. Included in the application was the State's request to regulate radioactive mixed waste.

EPA will soon publish a final decision on the Texas application in the Federal Register. However, the notice will not be published until a statutory amendment that affects the State's RCRA permitting program is acted upon by the Texas legislature.

We recommend that you continue to work with the Texas Water Commission since they will have the authority to issue the required permit. If this Agency can provide any further assistance, please contact me or have your staff call Ms. Lynn Prince, Regional Authorization Coordinator, at (214) 655-6750.

Sincerely yours,

Guanita Reiter
Chief
RCRA Programs Branch (6H-H)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VI
1445 ROSS AVENUE, SUITE 1200
DALLAS, TEXAS 75202

APRIL 21, 1989

Ms. Janet Greenberg
Project Manager
NSSI/Recovery Services, Inc. Project Team
ENSR Consulting and Engineering
3000 Richmond Avenue
Houston, Texas 77098

Re: NSSI/Recovery Services, Inc.
Industrial Solid Waste Registration No. 38669
EPA I.D. NO. TXD982560294

Dear Ms. Greenberg:

Thank you for the opportunity to answer your question concerning the subject facility. As you are aware, the State of Texas is authorized to administer the RCRA hazardous waste program; however, Texas is not authorized to regulate the radioactive mixed waste portion of the RCRA program.

Therefore, NSSI/Recovery Services, Inc., is not subject to RCRA regulation of radioactive mixed wastes "...until the State program is revised and authorized to issue RCRA permits for radioactive mixed waste." Once the State of Texas is authorized to regulate radioactive mixed wastes, "[m]ixed waste TSDF's [treatment, storage, or disposal facilities] in States with base program authorization must comply with applicable State requirements and deadlines for obtaining interim status as prescribed in authorized State law.

Texas has made application to receive authorization for the radioactive mixed waste program. The application is currently being reviewed by the U.S. Environmental Protection Agency (EPA). A final decision is expected to be made in a few months. If you have any further questions regarding the effective dates and/or specifics of the new Texas statutes implementing the mixed waste program, you should address your questions to the Texas Water Commission (TWC).

Part A revisions should be sent to TWC, not to EPA. NSSI/Recovery Services, Inc., must update its existing Part A by the deadline specified for obtaining interim status in the Texas law authorizing the radioactive mixed waste program. However, NSSI/Recovery Services, Inc., may submit its revised Part A to TWC before that deadline if it is convenient to do so.

Sincerely yours,

W K Honker

William K. Honker, Chief
RCRA Permits Branch

cc: Susan Ferguson
Texas Water Commission

G-100

TEXAS WATER COMMISSION

B. J. Wynne, III, Chairman
Paul Hopkins, Commissioner
John O. Houchins, Commissioner



Allen Beinke, Executive Director
Michael E. Field, General Counsel
Brenda W. Foster, Chief Clerk

July 24, 1989

Mr. William K. Honker, Chief
RCRA Permits Branch
U. S. Environmental Protection Agency
Region VI - 6H-PT
1445 Ross Avenue
Dallas, Texas 75202-2733

Re: Transmittal of an RCRA Facility Assessment
NSSI/Recovery Service, Inc. - Houston, Texas
Solid Waste Registration No. 38669
EPA I.D. No. TXD 982560294

Dear Mr. Honker:

Consonant with the agreement made between the State of Texas and the U.S. Environmental Protection Agency (EPA) this letter and enclosures constitute the RCRA Facility Assessment (RFA) for NSSI/Recovery Service, Inc. - Houston, Texas. We understand that EPA has committed to a 30-day review and comment period for RFA documents so that the Texas Water Commission can proceed with permitting.

The Preliminary Review (PR), copy enclosed, presents information about all units managing waste materials as well as information about waste materials managed. The PR has been merged into the attached Visual Site Inspection (VSI) report so that, for each unit, the VSI pages and the PR pages are adjacent. The units at the facility are classified into one of the following five categories:

RCRA-Regulated Units

- Storage Tanks 1 through 15
- Acid-Base Neutralization Tank
- Oxidation-Reduction Tank (600 gallons)
- Oxidation-Reduction Tank (400 gallons)
- Reactive Container Storage Area
- Container Storage Area Within Building 1
- Building Two (under construction)
- Ionic Exchange Unit
- Stabilization and Fixation Unit
- Grinder and Screen
- Lab Pack Sorting and Consolidation Area
- Rotex Screen and Hopper System
- Portable Filtration Units

G-101

July 24, 1989

RCRA Units Being Closed

- Wastewater Tanks
- Grinder Tanks
- Open-Air Container Storage Area

Mixed Waste Management Unit

- Mixed Waste Compaction and Sorting Area

Solid Waste Management Unit

- Cullet Dumpster

"Other" Units

- Carbon Adsorption Unit
- Vapor Scrubbers

All units on-site are of such design and status as to justify a recommendation of "no further action".

In conclusion there is insufficient evidence to warrant an RFI for any unit on this facility site.

Questions or comments on the RFA should be directed within 30 days from the date of this letter to Alan P. Church, P.E. at AC512/463-8559.

Sincerely,

Ray H. Austin, P.E.
Minor Brooks Hibbs, Chief
Permits Section
Hazardous and Solid Waste Division

APC:bb

Enclosure: PR and VSI

xc: Robert D. Gallagher, NSSI - Houston (with VSI)
Shirley Workman, EPA - Dallas
TWC Southeast Region Office - Deer Park (with VSI)
Paul Lewis, TWC Enforcement Section - Austin

F
R
O
M

CITY OF HOUSTON

Fire Department/Fire Marshall's Office
410 Bagby • Houston, Texas 77002

JUL 18 1991

3A ***** Acknowledgment of Payment Received *****

This is an acknowledgment that the Permit Office of the Houston Fire Department did receive your application and fee for a Fire Prevention Permit. A Fire Inspector will be assigned to inspect, for approval of your permit, as soon as possible. Please verify the information below:

Requested Type of Permit: CHEMICAL, HAZARDOUS (STORAGE OR USE)

Location to be Permitted: 5731 ETHERIDGE ST.

Your Check/Money Order #: 031285

Amount Paid: \$150.00

Property Controlled By: ROBERT D. GALLAGHER

Business Phone Number: (713) 641 0391

If any information is not correct or if you need further information, call the Permit Office (Mon thru Fri, 7:30 AM to 5:00 PM) at 247-3709.

Application Date: 6/27/91

TO:

Sections: SE Key Map: 5340

HFD No. 00000 7/15/91

M

Permit Number: 6410391001

CML

NUCLEAR SOURCES & SERVICES, INC.

P. O. BOX 84042

HOUSTON, TEXAS 77283

Attn: ROBERT D. GALLAGHER

F
R
O
M

CITY OF HOUSTON

Fire Department/Fire Marshall's Office
410 Bagby • Houston, Texas 77002

JUL 19 1991

4A ***** Acknowledgment of Payment Received *****

This is an acknowledgment that the Permit Office of the Houston Fire Department did receive your application and fee for a Fire Prevention Permit. A Fire Inspector will be assigned to inspect, for approval of your permit, as soon as possible. Please verify the information below:

Application Date: 6/27/91

TO:

Permit Number: 6410391000

M

CML

NUCLEAR SOURCES & SERVICES, INC.

P. O. BOX 84042

HOUSTON, TEXAS 77283

Attn: ROBERT D. GALLAGHER

MAY 14 1990

DW0550

TEXAS WATER COMMISSION
NOTICE OF REGISTRATION
SOLID WASTE MANAGEMENT

05-08-90

THIS IS NOT A PERMIT AND DOES NOT CONSTITUTE AUTHORIZATION OF ANY WASTE MANAGEMENT ACTIVITIES OR FACILITIES LISTED BELOW. REQUIREMENTS FOR SOLID WASTE MANAGEMENT ARE PROVIDED BY TEXAS ADMINISTRATIVE CODE SECTION 335 OF THE RULES OF THE TEXAS WATER COMMISSION (TWC). CHANGES OR ADDITIONS TO WASTE MANAGEMENT METHODS REFERRED TO IN THIS NOTICE REQUIRE WRITTEN NOTIFICATION TO THE TWC.

DATE OF NOTICE: 03-13-90

REGISTRATION DATE: 12-07-88

REGISTRATION NUMBER: 38669

EPA I.D. NUMBER: TXD982560294

THE REGISTRATION NUMBER PROVIDES ACCESS TO STORED INFORMATION PERTAINING TO YOUR OPERATION. PLEASE REFER TO THAT NUMBER IN ANY CORRESPONDENCE.

COMPANY NAME: NSSI/RECOVERY SERVICES, INC.

P.O. BOX 34042

HOUSTON,

TX 77234

GENERATING SITE LOCATION:

5709-5747 ETHERIDGE

CONTACT PERSON: ROBERT D GALLAGHER

PHONE: (713) 641-0391

NUMBER OF EMPLOYEES: LESS THAN 100

TWC DISTRICT: 07

REGISTRATION STATUS: ACTIVE

REGISTRATION TYPE: GENERATOR/RECEIVER/TRANSPORTER

HAZARDOUS WASTE STATUS:

GENERATOR/TRANSPORTER

I. WASTE GENERATED:

WASTE NUMBER	DESCRIPTION	CLASS	CODE	DISPOSITION
001	WASTEWATER CONTAINING ORGANICS , TRACE METALS, AND OIL	IH	907870	ON-SITE/OFF-SITE
EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS):				
002	ORGANIC LIQUIDS	IH	916300	ON-SITE
EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS):				
003	SLUDGES, HAZARDOUS	IH	951850	ON-SITE/OFF-SITE

NOTICE OF REGISTRATION (CONTINUED)
REGISTRATION NUMBER: 38669
COMPANY NAME: NSSI/RECOVERY SERVICES, INC.

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS):

004 STILL BOTTOMS, SOLVENT RECOVER IH 950240 ON-SITE/OFF-SITE
Y

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS):

005 CONCRETE AND/OR METAL, MISC. C IH 979250 ON-SITE/OFF-SITE
HEMICAL CONTAMINATED

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS):

006 TANK BOTTOMS IH 952180 ON-SITE

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS):

007 CARBON, ACTIVATED, SPENT IH 981730 ON-SITE/OFF-SITE

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS):

008 ION EXCHANGE RESIN IH 949990 ON-SITE/OFF-SITE

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS):

009 FILTER WASTES IH 973340 ON-SITE/OFF-SITE

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS):

010 DUST, GRINDING IH 973460 ON-SITE/OFF-SITE

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS):

011 TRASH AND DEBRIS I 183780 ON-SITE/OFF-SITE

012 CHEMICAL CONTAMINATED WASTE, L IH 910191 ON-SITE/OFF-SITE
LIQUID

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS):

013 CHEMICAL CONTAMINATED WASTE, S IH 988000 ON-SITE/OFF-SITE
OLID

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS):

NOTICE OF REGISTRATION (CONTINUED)
REGISTRATION NUMBER: 38669
COMPANY NAME: NSSI/RECOVERY SERVICES, INC.

II. Shipping/Reporting: Pursuant to Section 335 of the Texas Administrative Code of the rules of the TWC pertaining to Hazardous Waste management, issuance of manifests and annual reporting are required for Off-site Storage/Processing/Disposal of the following wastes listed in Part I. All manifested wastes should be reported on the annual waste summary report and submitted to the TWC by the 25th of each January for the prior calendar year.

001	907870	WASTEWATER CONTAINING ORGANICS , TRACE METALS, AND OIL
003	951850	SLUDGES, HAZARDOUS
004	950240	STILL BOTTOMS, SOLVENT RECOVER Y
005	979250	CONCRETE AND/OR METAL, MISC. C HEMICAL CONTAMINATED
007	981730	CARBON, ACTIVATED, SPENT
008	949990	ION EXCHANGE RESIN
009	973340	FILTER WASTES
010	973460	DUST, GRINDING
011	183780	TRASH AND DEBRIS
012	910191	CHEMICAL CONTAMINATED WASTE, L IQUID
013	988000	CHEMICAL CONTAMINATED WASTE, S OLID

III. ON-SITE WASTE MANAGEMENT FACILITIES:

FAC NO.	FACILITY	STATUS
01	TANK (SUB-SURFACE) STORAGE/PROCESSING 1500 GALS. WASTEWATER TANKS	INACTIVE
02	TANK (SURFACE) STORAGE/PROCESSING OF WASTE NUMBER(S) 001 20000 GALS WASTEWATER TANKS	ACTIVE
03	TANK (SURFACE) STORAGE/PROCESSING OF WASTE NUMBER(S) 001	ACTIVE

- 1300 GALS
NEUTRALIZATION TANK
- 04 TANK (SURFACE) ACTIVE
STORAGE/PROCESSING
OF WASTE NUMBER(S) 001, 002, 003
1000 GALS.
CHEMICAL OXIDATION/REDUCTION TANKS
- 05 TANK (SURFACE) INACTIVE
PROCESSING
OF WASTE NUMBER(S) 002
200 GPD
SOLVENT RECOVERY TANK
PROPOSED FACILITY
- 06 MISCELLANEOUS STORAGE CONTAINERS ACTIVE
PROCESSING
OF WASTE NUMBER(S) 002, 003, 004, 006, 007, 008,
009, 010, 011, 012, 013
1000 GPD
STABILIZATION/FIXATION UNIT (PROCESSING IN CONTAINERS)
- 07 TANK (SURFACE) ACTIVE
STORAGE/PROCESSING
OF WASTE NUMBER(S) 001, 002, 006
29600 GALS
BLENDING/SEPARATION/ STORAGE TANKS
ADDITIONAL 4700 GALLONS CAPACITY PROPOSED
- 08 CONTAINER STORAGE AREA ACTIVE
STORAGE
OF WASTE NUMBER(S) 001, 002, 003, 004, 005, 006,
007, 008, 009, 010, 011, 012,
013
79860 GAL.
BUILDING NO. 1 CONTAINER STORAGE AREA
- 09 MISCELLANEOUS STORAGE CONTAINERS ACTIVE
STORAGE/PROCESSING
OF WASTE NUMBER(S) 007
100 GPD
CARBON ADSORPTION UNIT
- 10 MISCELLANEOUS STORAGE CONTAINERS ACTIVE
STORAGE/PROCESSING
OF WASTE NUMBER(S) 001, 008
5000 GPD
ION EXCHANGE UNIT
- 11 MISCELLANEOUS STORAGE CONTAINERS ACTIVE
STORAGE/PROCESSING
OF WASTE NUMBER(S) 001, 002, 003, 006, 009, 010
5000 GPD
FILTERS

NOTICE OF REGISTRATION (CONTINUED)

REGISTRATION NUMBER: 38669

COMPANY NAME: NSSI/RECOVERY SERVICES, INC.

- | | | |
|----|---|----------|
| 12 | CONTAINER STORAGE AREA
STORAGE
OF WASTE NUMBER(S) 012, 013
500 GALS.
REACTIVE CONTAINER STORAGE AREA | ACTIVE |
| 13 | MISCELLANEOUS STORAGE CONTAINERS
STORAGE
OF WASTE NUMBER(S) 011
10000 PPD
DUMPSTER | ACTIVE |
| 14 | MISCELLANEOUS STORAGE CONTAINERS
PROCESSING
OF WASTE NUMBER(S) 003, 004, 006, 007, 008, 009,
010, 013
220000 PPM
SOLIDS CLEANING AREA
(PROCESSING AREA) | ACTIVE |
| 16 | TANK (SURFACE)
STORAGE
OF WASTE NUMBER(S) 002
128 CU.FT.
GRINDER TANKS | INACTIVE |
| 17 | CONTAINER STORAGE AREA
STORAGE
OF WASTE NUMBER(S) 001, 002, 003, 004, 005, 006,
007, 008, 009, 010, 011, 012,
013
29700 GALS
BUILDING NO. 2 CONTAINER STORAGE AREA
PROPOSED FACILITY | INACTIVE |
| 18 | CONTAINER STORAGE AREA
STORAGE
OF WASTE NUMBER(S) 012, 013
3120 GALS. | ACTIVE |
| 19 | TANK (SURFACE)
STORAGE
OF WASTE NUMBER(S) 002
2000 GAL.
2-GRINDER TANKS OF 1000 GALS. EACH | ACTIVE |

UNLESS OTHERWISE STATED ABOVE, FACILITIES ARE LOCATED
AT 5709-5747 ETHERIDGE
COUNTY OF HARRIS

IV. RECORDS.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1

- 001 907870 WASTEWATER CONTAINING ORGANICS
, TRACE METALS, AND OIL

003 951850 SLUDGES, HAZARDOUS

005 979250 CONCRETE AND/OR METAL, MISC. C
HEMICAL CONTAMINATED

007 981730 CARBON, ACTIVATED, SPENT

009 973340 FILTER WASTES

011 183780 TRASH AND DEBRIS

013 988000 CHEMICAL CONTAMINATED WASTE, S
OLID

Exhibit C4

RADIOACTIVE MATERIALS LICENSE FOR NSSI

TEXAS DEPARTMENT OF HEALTH
RADIOACTIVE MATERIAL LICENSE

09411

Pursuant to the Texas Radiation Control Act and Texas Department of Health regulations on radiation, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess and transfer radioactive material listed below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations and orders of the Texas Department of Health now or hereafter in effect and to any conditions specified below.

LICENSEE			This license issued pursuant to and in accordance with	
1. Name Nuclear Sources and Services, Inc. DBA NSSI/Recovery Services, Inc. ATTN: Mr. Robert D. Gallagher 2. Address P. O. Box 34042 Houston, Texas 77034			<input type="checkbox"/> APPLICATION <input checked="" type="checkbox"/> LETTER <input type="checkbox"/>	
			Dated: September 29, 1983	
			Signed By: Robert D. Gallagher	
			3. License Number L01811	Amendment Number 42
			PREVIOUS AMENDMENTS ARE VOID	
			4. Expiration Date April 30, 1995	
RADIOACTIVE MATERIAL AUTHORIZED				
5. Radioisotope A. Any radioactive material.	6. Form of Material A. Radioactive Waste as defined in <u>Texas Regulations for Control of Radiation</u> (TRCR) 44.2	7. Maximum Activity* A. Activities of groups as specified under TRCR 44.5(a) for a Class B Processing Facility not to exceed the following: Group I. 1 Ci Group II. 10 Ci Group III. 100 Ci Group IV. 1000 Ci	8. Authorized Use A. Receipt from other persons, processing, research and development, and transfer to licensed radioactive waste disposal sites or other licensed recipients.	
<input checked="" type="checkbox"/> CONTINUED ON PAGE 2, IF CHECKED.				

CONDITIONS

9. Radioactive material shall be used only at:

Subsite Number
000Location
Houston - 5711 Etheridge (this address shall consist of all properties operated by the licensee within an area bounded on the north by Moline Street, on the south by Joyner Street, on the east by Northdale Street,

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TEXAS DEPARTMENT OF HEALTH
RADIOACTIVE MATERIAL LICENSE

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Supplementary Sheet

LICENSE NUMBER	AMENDMENT NUMBER
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5. Radio-isotope

B. Any radioactive material.

6. Form of Material

B. Radio-active Waste as defined in TRCR 44.2.

7. Maximum Activity

B. Activities of groups as specified under TRCR 44.5(a) for a Class B Storage Facility not to exceed the following:
Group I. 2 Ci
Group II. 20 Ci
Group III. 200 Ci
Group IV. 2000 Ci

8. Authorized Use

B. Receipt from other persons, storage, and transfer to licensed radioactive waste disposal sites or other licensed recipients.

C. Any radioactive material

C. Sealed sources received as radioactive waste

C. Total activity not to exceed 2000 Ci

C. Receipt from other persons, storage, processing and transfer to licensed radioactive waste disposal sites or other licensed recipients.

D. Special Nuclear Material

D. Any received as radioactive waste

D. As specified in TRCR 11.2 "Special Nuclear Material in Quantities not Sufficient to Form a Critical Mass"

D. Receipt from other persons, storage, processing and transfer to licensed radioactive waste disposal sites or other licensed recipients.

CONDITIONS CONTINUED ON PAGE 3

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RADIOACTIVE MATERIAL LICENSEPage 3 of 13 Pages

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Supplementary Sheet

LICENSE NUMBER	AMENDMENT NUMBER
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CONDITIONS CONTINUED:

9. (continued)

and on the west by Cheswood Street, and is further identified as Block 37, lots 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 17, and 18, and Block 38, lots 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18 in Houston, Texas as indicated in Attachment 1, which is attached hereto and is made a part hereof).

10. The licensee shall comply with the provisions of TRCR Parts 11, 12, 13, 21, 22, 41, and 44.
11. The activities authorized by this license shall only be performed by individuals designated by the licensee's Radiation Safety Committee or by persons working under the direct supervision of persons designated by the licensee's Radiation Safety Committee.
12. The individual designated to perform the functions of Radiation Safety Officer (RSO) for activities covered by this license is Robert D. Gallagher.
13. The licensee is authorized to possess special nuclear material only in quantities not to exceed that specified in TRCR 11.2. The total amount of special nuclear material possessed under all licenses issued by this Agency at the licensee's facility described in Condition No. 9 shall not exceed the TRCR 11.2 limits.
14. A. The licensee is authorized to collect and repack radioactive waste at customer sites throughout Texas and transport the radioactive waste in containers that comply with United States Department of Transportation (USDOT) specifications to the licensee's or other properly licensed facility.

B. Waste processing under this license is limited to that as defined by the TRCR and the following:
 - (1) Receipt and survey in accordance with procedures contained in the application dated September 29, 1983 and letter dated September 14, 1984;

CONDITIONS CONTINUED ON PAGE 4

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RADIOACTIVE MATERIAL LICENSEPage 4 of 13 Pages

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Supplementary Sheet

LICENSE NUMBER	AMENDMENT NUMBER
L01811	42

CONDITIONS CONTINUED:

14. B. (continued)

- (2) Repackaging in accordance with procedures contained in the application dated September 29, 1983;
- (3) Compaction and consolidation in accordance with procedures contained in the application dated September 29, 1983;
- (4) Separation and processing of liquid scintillation media, containers, and other bulk liquid and solid waste into: (a) liquid fractions; (b) solid fractions; and (c) rinses in accordance with procedures contained in the application dated September 29, 1983 and letter dated September 14, 1984.
- (5) Solidification of liquid radioactive waste using media acceptable to low-level waste disposal sites.

15. Empty or processed liquid scintillation vials may be disposed of in accordance with TRCR 21.307 (a) without regard to their radioactivity if: (1) concentrations of carbon-14, hydrogen-3, or iodine-125 do not exceed .05 microcuries per gram; or (2) for any other radionuclide, concentrations which do not exceed TRCR Appendix 21-A, Table II, Column 2 limits.

The determination of concentration shall be made with at least a 100 gram sample collected from each process batch.

16. While on site, waste will remain physically identifiable as radioactive waste and traceable to waste receipt records until shipment for disposal.
17. A. Waste inventory shall be computed in units of, or equivalent to the volume of 55-gallon drums (7.35 cubic feet). When computing the total inventory, any drum or container not equal to the volume of a 55-gallon drum shall be included in the inventory as its 55-gallon drum equivalent (e.g., a 30-gallon container has a volume equal to 30/55 of a 55-gallon drum).
- B. Any container that contains any quantity of radioactive waste shall be counted as a full container in the drum equivalent inventory unless it can be readily verified as empty.

CONDITIONS CONTINUED ON PAGE 5

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RADIOACTIVE MATERIAL LICENSEPage 5 of 13 Pages

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Supplementary Sheet

LICENSE NUMBER	AMENDMENT NUMBER
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CONDITIONS CONTINUED:

17. (continued)

C. By January 15, April 15, July 15 and October 15 of each year the licensee shall submit a written report to the Agency which includes the following information about the preceding calendar quarter:

- (1) The number of drum equivalents and activity on hand at the beginning and end of the quarter;
- (2) The number of drum equivalents and activity received during the quarter;
- (3) The number of drum equivalents and activity processed during the quarter;
- (4) The number of drums or drum equivalents disposed of at a licensed low-level radioactive waste disposal site; and
- (5) Volume and activity of waste disposed of in accordance with TRCR 21.307(a) and the identity of the disposal site (e.g., the name of the municipal landfill, incinerator, etc.) and the date of each disposal.

D. No more than 4000 55-gallon drum equivalents of radioactive waste shall be possessed at any one time.

18. A. The outer surfaces of each container shall be wipe tested for removable contamination upon receipt or repackaging and just prior to transfer. Any container with removable contamination in excess of 2200 dpm/100 cm² (alpha) or 22000 dpm/100 cm² (beta-gamma) shall be decontaminated. Drum storage area floors shall be wipe-tested at least quarterly to confirm that containers are not leaking radioactive materials.

B. Containers shall be visually inspected at least quarterly. Any container showing signs of rusting, physical damage, leaking materials, or other deterioration shall be repackaged as soon as practicable, but not later than ten days.

C. Upon receipt, the surface of each container shall be surveyed individually to assess the external radiation fields present and a record made of the highest surface reading noted.

CONDITIONS CONTINUED ON PAGE 6

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RADIOACTIVE MATERIAL LICENSEPage 6 of 13 Pages

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Supplementary Sheet

LICENSE NUMBER	AMENDMENT NUMBER
L01811	42

CONDITIONS CONTINUED:

19. Records of all environmental sampling results; visual and physical inspections; radiation surveys; bioassay; personnel monitoring; personnel contamination surveys; radioactive material receipt, transfers, and disposals; management safety audits; biweekly wipe surveys of any restricted and unrestricted areas; area surveys and other records required by TRCR and this license shall be maintained by the licensee, in accordance with the time limits specified by the TRCR, for inspection by the Agency.
20. A. Shipments of radioactive waste by the licensee shall meet the requirements of the U.S. DOT, as specified in Title 49 Code of Federal Regulations and the requirements of the waste disposal site to which they are being shipped.
- B. The licensee is authorized to store any package prepared for shipment containing waste byproduct, source or special nuclear material in truck trailers at the licensee's facility for periods not to exceed ten working days prior to transport to a disposal site.
21. The licensee shall maintain for inspection by the Agency an inventory of all radioactive waste possessed under this license. The inventory shall show the radionuclide, date received, from whom received, amount of activity, physical form, date processed, original and reassigned drum or container number, and the date transferred for disposal. In addition, the licensee shall at least monthly generate a cumulative inventory, by radionuclide, which demonstrates compliance with the appropriate processing group limits of TRCR 44.5.
22. A. The clothing and skin of all employees (including permanent and contract workers) working in a radiation restricted area shall be monitored with radiation detecting instrumentation for contamination prior to departure from the facility. Contamination exceeding 20 dpm/100 cm² (alpha) and/or 1,000 dpm/100 cm² (beta-gamma) shall be removed prior to an individual departing the radiation restricted area.

CONDITIONS CONTINUED ON PAGE 7

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RADIOACTIVE MATERIAL LICENSEPage 7 of 13 Pages

Supplementary Sheet

24644

LICENSE NUMBER	AMENDMENT NUMBER
L01811	42

CONDITIONS CONTINUED:

22. (continued)

- B. Areas found to possess contamination in excess of 2200 dpm/100 cm² (removable alpha) and/or 22,000 dpm/100 cm² (removable beta-gamma) shall be decontaminated and resurveyed to assure that removable contamination is below the aforementioned limits. The limits do not apply to the contents of properly packaged waste materials, to waste materials during processing, or to the inner surfaces of processing equipment and air handling, sampling, or exhausting equipment.
23. A. Radiation safety training shall be given to radiation workers and radiation safety technicians in accordance with the licensee's letter dated September 14, 1984. All permanent radiation workers shall attend the "Radiation Workers Training Program" within 30 days of employment and shall attend the "Respirator Training Program" prior to working in areas requiring respiratory protection.
- B. Contract or temporary workers working in any radiation restricted area will work only under the direct supervision of a Radiation Safety Technician and shall not work in any radiation restricted area alone.
- C. All female employees who enter any radiation restricted area will be given instruction concerning prenatal radiation exposure.
- D. All training will be documented. Documentation of the training shall be made available for Agency inspection.
24. The licensee shall provide appropriate respiratory protection for persons working in areas where airborne contamination at concentrations above the limits specified in TRCR Appendix 21-A, Table I, Column I is possible. A physical inspection to include wipe testing of the respirator shall be performed before each use, but not less frequently than quarterly. Persons working in those areas shall be tested for proper fit of respirators at least once each year. Records of the physical inspection, fit test and training given to employees shall be maintained for inspection by the Agency.

CONDITIONS CONTINUED ON PAGE 8

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RADIOACTIVE MATERIAL LICENSEPage 8 of 13 Pages

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Supplementary Sheet

LICENSE NUMBER	AMENDMENT NUMBER
L01811	42

CONDITIONS CONTINUED:

25. Respirators made available for use must show no removable alpha contamination in excess of 22 dpm/100 cm², no removable beta-gamma contamination in excess of 220 dpm/100 cm², no fixed alpha contamination in excess of 100 dpm/100 cm², or no fixed beta-gamma contamination in excess of 1,000 dpm/100 cm².
26. Individuals involved in operations which utilize, during any 24-hour period, more than 50 millicuries of iodine-125 (I-125) and/or iodine-131 (I-131) or unvented operations involving 10 millicuries of I-125 and/or I-131 in a noncontained form shall have bioassays performed within one week. If the use of I-125 and/or I-131 is on a continual basis, bioassays shall be performed once every two weeks. The action points listed below shall be observed:
- A. Whenever the thyroid burden at the time of measurement exceeds 0.12 microcuries of I-125 or 0.04 microcuries of I-131, the following actions shall be taken:
- (1) An investigation of the operations involved, including ventilation surveys, shall be carried out immediately to determine the causes of exposure and to evaluate the potential for further exposures.
 - (2) If the investigation indicates a potential for excessive worker exposure, access will be controlled until the source of exposure is discovered and corrected.
 - (3) Corrective actions that will eliminate or lower the potential for further exposures shall be implemented.
 - (4) A repeat bioassay shall be taken within one week of the previous measurement in order to confirm the effectiveness of the corrective action taken.
 - (5) Reports or notification shall be provided as required by TRCR 21.405 and 21.408.
- B. If the thyroid burden at any time exceeds 0.5 microcuries of I-125 or 0.14 microcuries of I-131, the following actions shall be taken:
- (1) Prevent the individual from any further handling of I-125 or I-131 until the thyroid burden is below the above limits.
 - (2) Carry out all steps described above.

CONDITIONS CONTINUED ON PAGE 9

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TEXAS DEPARTMENT OF HEALTH
RADIOACTIVE MATERIAL LICENSE

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Supplementary Sheet

LICENSE NUMBER	AMENDMENT NUMBER
L01811	42

CONDITIONS CONTINUED:

26. B. (continued)

(3) As soon as possible, refer the case to appropriate medical consultation for recommendations regarding therapeutic procedures that may be carried out to accelerate removal of radioactive iodine from the body. This should be done within 2-3 hours after exposure when the time of exposure is known so that any prescribed thyroid blocking agent would be effective.

(4) Carry out repeated measurements at approximately one-week intervals at least until the thyroid burden is less than 0.12 microcuries of I-125 or 0.04 microcuries of I-131.

27. A. Individuals involved in operations which utilize, at any one time, more than 100 millicuries of hydrogen-3 in a noncontained form, other than metallic foil, outside of a glovebox shall have bioassays performed within one week following a single operation and at weekly intervals for continuing operations.

B. Hydrogen-3 shall not be used in such a manner as to cause any individual to receive a radiation exposure such that urinary excretion rates exceed 28 microcuries of hydrogen-3 per liter when averaged over a calendar quarter.

C. A report of an average concentration in excess of the limit specified in Part B of this condition for any individual shall be filed, in writing, within 30 days of the end of the calendar quarter with the Agency. The report shall contain the results of all urinalysis for the individual during the calendar quarter, the cause of the excessive concentrations, and the corrective steps taken or planned to assure against a recurrence.

D. Any single urinalysis which discloses a concentration of greater than 50 microcuries per liter shall be reported, in writing, within seven days of the licensee's receipt of the results.

CONDITIONS CONTINUED ON PAGE 10

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TEXAS DEPARTMENT OF HEALTH
RADIOACTIVE MATERIAL LICENSE

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Supplementary Sheet

LICENSE NUMBER	AMENDMENT NUMBER
L01811	42

CONDITIONS CONTINUED:

28. A. If air sample results indicate that an airborne release in excess of ten times the limits of TRCR Appendix 21-A, Table I, Column 1 occurred to the restricted area or to any portion of the restricted area, the licensee shall immediately perform bioassays on all individuals who were present. If the bioassay results indicate that the maximum permissible body burden was exceeded for any individual; the individual shall have a whole body count performed to determine the uptake, if appropriate for the radionuclide. Appropriate measures to enhance elimination shall be made in consultation with the licensee's consulting physician.
- B. If any air sample results indicate that an airborne release to the unrestricted area in excess of the limits of TRCR Appendix 21-A, Table II, Column 2 has occurred, the licensee shall take appropriate measures to determine the dose to the maximally exposed member of the public downwind of the plume and notify the Agency in writing within five working days of the sample analysis and the dose assessment.
29. ~~Records of bioassays, thyroid counts, whole-body exposures, any dose to employees or members of the public and any corrective actions taken shall be maintained for Agency inspection.~~
30. ~~The licensee shall conduct the radiation survey and area monitoring program as described in Sections 5.2, 5.3, and 5.4 of the document entitled "Operating Procedures for the Radioactive Waste Processing and Storage Facilities at Houston, Harris County" dated September 1983, at the locations indicated in Drawing No. 100-83023-B, "Site Plan - Nuclear Sources and Services Inc." dated August 10, 1983. The monitoring program will be reviewed at least semiannually by the Radiation Safety Committee to assure its adequacy for the size and scope of operations at the facility. A report of its analyses shall be kept for Agency inspection.~~
31. Once each calendar quarter the licensee shall collect three environmental soil samples from the following locations:
- A. South of the NSSI office building, west of 5747 Etheridge, just west of the fence on the east side of Etheridge, on the south side of the driveway, in the low drainage area;

CONDITIONS CONTINUED ON PAGE 11

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TEXAS DEPARTMENT OF HEALTH
RADIOACTIVE MATERIAL LICENSE

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Supplementary Sheet

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LICENSE NUMBER	AMENDMENT NUMBER
L01811	42

CONDITIONS CONTINUED:

31. (continued)

- B. Southwest of the NSSI office building, just west of the fence on the east side of Etheridge, just south of the main gate drive where the slab drainage exists at the site.
- C. Southwest of the NSSI office building, just west of the fence on the east side of Etheridge, on the south side of the driveway to the drum storage area and waste storage and processing building, in the low drainage area.

32. The RSO and the Radiation Safety Committee shall review the following areas of the radiation safety program at least semiannually:

- A. health physics authority and responsibility;
- B. operating procedures (involving the handling, processing and/or storage of radioactive materials);
- C. audits, inspections, and surveys conducted by the facility RSO (for timeliness and the resolution of any problems);
- D. radiation protection including employee exposure records; bioassay procedures and results; quarterly, semiannual, or annual surveys and inspections; radiological survey and sampling data; and any changes in operating procedures;
- E. radiation safety training;
- F. respiratory protection program;
- G. facility and equipment design including ventilation rates within various portions of the facility, and fire control;
- H. control of airborne radioactive materials;
- I. compliance with applicable federal and state regulations and the conditions of this license; and
- J. the audit of drum inspection and receipt procedures.

A copy of this report shall be maintained for review by the Agency.

33. Modifications of existing facilities or construction of a new facility requiring a change in the operating procedures or the use of new radioisotope handling facilities shall be approved by the Agency prior to the initiation of their use on a commercial scale.

CONDITIONS CONTINUED ON PAGE 12

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RADIOACTIVE MATERIAL LICENSEPage 12 of 13 Pages

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Supplementary Sheet

LICENSE NUMBER	AMENDMENT NUMBER
L01811	42

CONDITIONS CONTINUED:

34. A. The licensee shall post and maintain financial security.
- B. Financial security shall be in the form of a preapproved trust agreement with the Agency designated as the beneficiary.
- C. The amount of financial security shall be based on the average number of drum-equivalents of radioactive waste, as determined from a count obtained during the two inspections made during the prior year. The amount of financial security required shall be reviewed on a yearly basis and adjusted to reflect the average number of drums as determined during the two semi-annual inspections. No adjustment shall be made downward unless the total amount of security equals the total amount required by the Agency based on the preceding year's average drum count.
- D. The initial amount of financial security is \$225,000, based upon ~~\$300 per drum-equivalent of radioactive waste counted on-site during the two inspections conducted prior to issuance of Amendment No. 42 of this license.~~ This amount is to be paid as provided in Parts E and F of this condition.
- E. The initial payment to the trust fund shall be in the amount of \$56,250.
- F. Payments to the trust fund shall be made on a semi-annual basis (June 1 and December 1) until the total amount of financial security required is attained. ~~The semi-annual payments shall be in the amount of \$2.00 for every cubic foot of radioactive waste received during the six month period.~~
- G. In no event shall the amount of the security be less than \$56,250. This amount may be reviewed annually.
35. The licensee shall provide the Agency a Certificate of Insurance which indicates that the requirements of TRCR 44.30(c) have been fulfilled. Should the licensee be unable to obtain such insurance coverage, every six months the licensee shall submit documentation of attempts to obtain the liability insurance and a request for exemption from TRCR 44.30(c).

CONDITIONS CONTINUED ON PAGE 13

(2/88)

TEXAS DEPARTMENT OF HEALTH
RADIOACTIVE MATERIAL LICENSEPage 13 of 13 Pages

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Supplementary Sheet

LICENSE NUMBER	AMENDMENT NUMBER
L01811	42

CONDITIONS CONTINUED:

36. The licensee shall notify the Agency in writing or via telephone at least 48 hours in advance of shipping its low-level radioactive waste, including the shipment of TRCR 21.307 (a) waste, to a commercial treatment, storage, or disposal site.
37. All containers of radioactive waste shall be stored within enclosed buildings with the following exceptions:
- A. Containers may be stored outside temporarily (i.e., not to exceed one week) while being received or being prepared for shipment.
 - B. Bulk flammable liquids shall be stored in accordance with local applicable fire safety regulations.
38. For research and development of waste processing techniques, the licensee is authorized to process up to 15 drum equivalents at any one time using new procedures, equipment, facilities, and technology without prior approval from the Agency. All research and development studies must be approved by the Radiation Safety Committee, and a summary report of such activities provided to the Agency at least annually.
39. Except as specifically provided otherwise by this license, the licensee shall possess and use the radioactive material authorized by this license in accordance with statements, representations, and procedures contained in the following:

application dated September 29, 1983,
letter dated September 14, 1984.

The Texas Regulations for Control of Radiation shall prevail over statements contained in the above documents unless such statements are more restrictive than the regulations.

PES:dm

FOR THE TEXAS DEPARTMENT OF HEALTH

G-125

Date 2 August 1990A handwritten signature in cursive script, reading "Robert Bernstein".
Robert Bernstein, M.D., F.A.C.P.



FEB 13 1989

Texas Department of Health

Robert Bernstein, M.D., F.A.C.P.
Commissioner

1100 West 49th Street
Austin, Texas 78756-3189
(512) 458-7111

Radiation Control
(512) 835-7000

Robert A. MacLean, M.D.
Deputy Commissioner
Professional Services

Hermas L. Miller
Deputy Commissioner
Management and Administration

February 6, 1989

Nuclear Sources and Services, Inc.
Attn: Robert D. Gallagher
P.O. Box 34042
Houston, Texas 77034

Ref: Compliance No. D881318
License No. 11-1811
Inspection of Dec. 14, 1988
By Arthur Flores
At 5711 Etheridge
Houston, Texas

Dear Mr. Gallagher:

After reviewing the report of the inspection conducted by Mr. Arthur Flores on December 14, 1988, we are pleased to inform you that your radiation protection program, with regard to the records reviewed and procedures observed, appears to be in compliance with the applicable Texas Regulations for Control of Radiation and/or Conditions pertaining to the above referenced License.

Thank you for the cooperation and assistance provided during the inspection.

Sincerely,

Robert L. Green, Jr.
Technical Review and Enforcement Program
Radioactive Material Inspection and
Enforcement Branch
Division of Compliance and Inspection
Bureau of Radiation Control

Exhibit D1

**LIST OF PERMITS, LICENSES, OR AUTHORIZATIONS
PERTAINING TO QUADREX**

List of permits, licenses, or authorizations pertaining to Quadrex					
Type	Number	Issue date	Expiration date	Issued by	
Radioactive Materials License	1354-1	December 4, 1990	November 30, 1995	Florida Dept. of Health and Rehabilitative Services Office of Radiological Control P. O. Box 680069 Orlando, FL 32868-0069	
RCRA - Hazardous Waste Permit	HO 01-169480	September 28, 1990	September 27, 1995	Florida Dept. of Environmental Regulation Northeast District Suite 200, 7825 Baymeadows Way Jacksonville, FL 32256-7577	
EPA Generators Number	FLD 98 071 1071	None specified	None specified	Florida Dept. of Environmental Regulation Northeast District Suite 200, 7825 Baymeadows Way Jacksonville, FL 32256-7577	
FDER Used Oil Registration	50428-UO	July 1, 1991	Renewed annually	Florida Dept. of Environmental Regulation Twin Towers Office Building 2600 Blairstone Road Tallahassee, FL 32301	

Exhibit D2

RCRA HAZARDOUS WASTE PERMIT FOR QUADREX

III PERMITS/NOTIFICATION/REGISTRATION/LICENSE

RCRA Hazardous Waste Permit

Date of Issuance: September 28, 1990

Date of Expiration: September 27, 1995

EPA Permit Number: HO 01-169480

EPA I.D. Number: FLD 980711071

NPDES/Pretreatment

Quadrex does not discharge any material and is not subject to NPDES/Pretreatment permit requirements.

Storm Water Permit

Although a storm water permit is not required at this time, Quadrex is seeking a general permit to ensure compliance with Section 402(p) of the Clean Water Act.

RCRA Notification

EPA was renotified of Quadrex's hazardous waste and used oil marketing activities on May 24, 1991.

FDER Used Oil Registration

Date of Issuance: July 1, 1991

Date of Expiration: Renewed Annually

Registration Number: 50428-UO

Radioactive Materials License

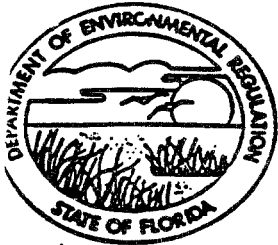
Date of Issuance: December 4, 1990

Date of Expiration: November 30, 1995

License Number: 1354-1

Exhibit D3

RCRA PART B PERMIT FOR QUADREX



Florida Department of Environmental Regulation

Northeast District • Suite 200, 7825 Baymeadows Way • Jacksonville, Florida 32256-7577 • 904-448-4300

Bob Martinez, Governor

Dale Twachumana, Secretary

John Shearer, Assistant Secretary
Ernest Frey, Deputy Assistant Secretary

PERMITTEE:

Attention: Mr. Bernhardt C. Warren
Quadrex Environmental Company
1940 Northwest 67th Place
Gainesville, Florida 32606-1649

I.D. Number: FLD 980 711 071
Permit/Certification No. HO 01-169480
Date of Issue: September 28, 1990
Expiration Date: September 27, 1995
County: Alachua
Latitude/Longitude: 29°42'08"N/82°20'51"W
Section/Township/Range: 18/9S/20E
Project: Operation of a tank and a
container storage area and
closure of a secondary container
storage area.

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rules 17-4 and 17-730. The above-named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

To close a secondary container storage area with dimensions of fifty feet square and maximum storage capacity of 480 fifty-five (55) gallon drums. This storage area is described in Figures 10 and 11 of the closure plan dated August 8, 1990.

To operate the following two (2) hazardous waste storage units at Quadrex Environmental Company, located at 1940 N.W. 67th Place, Gainesville, Florida. The facility is described in Figure 10 of the permit application dated September 1, 1989, and revised Figure 11 dated April 2, 1990:

- A. A container storage area as described in Figure 11 contains three (3) zones to store hazardous waste in containers ranging from $\frac{1}{2}$ gallon to fifty-five (55) gallon drums and other D.O.T. approved containers. The storage area is allowed to store a maximum volume of 72,100 gallons of hazardous waste.
- B. A 3,000 gallon aboveground storage tank, installed on September 1, 1983, is constructed of $\frac{1}{2}$ " carbon steel.

The hazardous wastes and hazardous wastes mixed with low level radioactive waste stored at this facility and their designated hazardous waste codes are as listed in Attachment A.

The Environmental Protection Agency (EPA) has determined that there is no evidence of releases of hazardous wastes or constituents from solid waste management units (SWMUs) at this facility. Therefore, at this time, Section 3004(u) of the Hazardous and Solid Waste Amendments (HSWA) of 1984 does not apply. The only provisions of HSWA which apply to the facility are the Section 3005(h) waste minimization certification and Section 3004(d) Land Disposal Restriction requirements, which have been incorporated into the proposed State permit. Since there are no other provisions of HSWA which affect this facility, the final State permit, if issued, will constitute the full RCRA permit required by DER and EPA.

PERMITTEE:
Quadrex Environmental Company
1940 N.W. 67th Place
Gainesville, Florida 32606-1649

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Operation of these units will be in accordance with the operation permit application dated September 1, 1989, and the supplemental information dated April 10, 1990, July 6, 1990, July 18, 1990 and August 3, 1990.

PERMITTEE:
Quadrex Environmental Company
1940 N.W. 67th Place
Gainesville, Florida 32606-1649

I.D. Number: FLD 980 711 071
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Date of Issue: September 28, 1990
Expiration Date: September 27, 1995

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits.. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.
3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state.. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefore caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.
6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.
7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:
 - a. Having access to and copying any records that must be kept under the conditions of the permit;

PERMITTEE:
Quadrax Environmental Company
1940 N.W. 67th Place
Gainesville, Florida 32606-1649

I.D. Number: FLD 980 711 071
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Date of Issue: September 28, 1990
Expiration Date: September 27, 1995.

7. (continued)

- b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
- c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated..

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the Department with the following information:

- a. a description of and cause of noncompliance; and
- b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or revocation of this permit.

- 9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the Department, may be used by the Department as evidence in any enforcement case arising under the Florida Statutes or Department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.
- 10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.
- 11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 17-4.120 and 17-730.300, as applicable. The permittee shall be liable for any noncompliance of the permitted activity until the transfer is approved by the Department.
- 12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.
- 13. This permit also constitutes:
 - () Determination of Best Available Control Technology (BACT)
 - () Determination of Prevention of Significant Deterioration (PSD)
 - () Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
 - () Compliance with New Source Performance Standards

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Quadrex Environmental Company
1940 N.W. 67th Place
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I.D. Number: FLD 980 711 071
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Date of Issue: September 28, 1990
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14. The permittee shall comply with the following monitoring and recordkeeping requirements:
- a. Upon request, the permittee shall furnish all records and plans required under Department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the Department, during the course of any unresolved enforcement action.
 - b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by Department rule.
 - c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the date(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.
15. When requested by the Department, the permittee shall, within a reasonable period of time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be submitted or corrected promptly.
16. In the case of a hazardous waste facility permit, the following permit conditions shall also apply:
- a. The permittee will submit the following reports to the Department:
 - (1) Manifest discrepancy report: If a significant discrepancy in a manifest is discovered, the permittee must attempt to reconcile the discrepancy. If not resolved within 15 days after receiving the waste, the permittee shall immediately submit a letter report including a copy of the manifest to the Department.
 - (2) Unmanifested waste report: Permittee shall submit an unmanifested waste report to the Department within 15 days of receipt of unmanifested waste.
 - (3) Annual report: An annual report covering facility activities during the previous calendar year must be submitted in accordance with Florida Administrative Code Rule 17-730.

PERMITTEE:
Quadrex Environmental Company
1940 N.W. 67th Place
Gainesville, Florida 32606-1649

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16. (continued)

- b.. Notification of any noncompliance which may endanger health or the environment, including the release of any hazardous waste that may endanger public drinking water supplies, or the occurrence of a fire or explosion from the facility which could threaten the environment or human health outside the facility, shall be verbally submitted to the Department within 24 hours and a written submission provided within 5 days. The verbal submission within 24 hours shall contain the name, address, I.D. number and telephone number of the facility and owner or operator, the name and quantity of materials involved, the extent of injuries (if any), an assessment of actual or potential hazards, and the estimated quantity and disposition of recovered material. The written submission shall contain the following:
 - (1) a description of and cause of noncompliance; and
 - (2) If not corrected, the anticipated time the noncompliance is expected to continue and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.
- c. Reports of compliance or noncompliance with, or any progress reports on, requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.
- d. All reports or information required to be submitted to the Department by a hazardous waste permittee shall be signed by a person authorized to sign a permit application.

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1940 N.W. 67th Place
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SPECIFIC CONDITIONS:

Part I - General Operating Requirements

1. The permittee shall maintain and operate the facility to minimize the possibility of fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or constituents to air, soil, or surface water which could threaten human health or the environment. [40 CFR 264.31]
2. The permittee shall notify the Department in writing at least four weeks in advance of the date the permittee expects to receive hazardous waste from a foreign source, in accordance with 40 CFR 264.12. Notice of subsequent shipments of the same waste from the same foreign source in the same calendar year is not required.
3. This permit allows the permittee to store at the facility only those wastes specified in Attachment A. Prior to acceptance of new hazardous wastes, the permittee shall submit to the Department, for approval, a waste analysis of the proposed new waste stream. This analysis must be incorporated in the general waste analysis plan and retained on-site. [40 CFR 264.13]
4. The permittee shall follow the procedures described in the waste analysis plan, Section A-6, Part II of the permit application. [40 CFR 264.13(b)]
5. The permittee shall comply with the security provisions of 40 CFR 264.14(b)(2) and (c).
6. The permittee shall inspect the facility operating, emergency and safety equipment in accordance with the schedule approved in Section A-4.d., Part II of the permit application. The permittee shall remedy any deterioration or malfunction discovered by an inspection in accordance with the requirements of 40 CFR 264.15(c). Changes, additions, or deletions to the schedule must be approved in writing by the Department. The schedule must be maintained as part of the operating record of the facility. [40 CFR 264.15]
7. Facility personnel must successfully complete the approved training program indicated in Section A-4.e., Part II of the permit application within 6 months of employment or assignment to a facility or to a new position at the facility. Verification of this training must be kept with the personnel training records and maintained on-site. Personnel shall not work unsupervised until training has been completed. The training must be reviewed by facility personnel at least annually. [40 CFR 264.16]
8. The permittee shall comply with the general requirements of 40 CFR 264.17(a) and (b), and the location requirements of 40 CFR 264.176 and 264.198.
9. The permittee shall comply with the following conditions concerning preparedness and prevention:
 - a. At a minimum, the permittee shall equip the facility with the equipment described in the contingency plan, Section A-4.b., Part II of the permit application, as required by 40 CFR 264.32.

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9. (continued)

- b. The permittee shall test and maintain the equipment specified in Condition 9.(a) as necessary to assure its proper operation in time of emergency as required by 40 CFR 264.33.**
 - c. The permittee shall maintain access to the communications or alarm system as required by 40 CFR 264.34.**
 - d. At a minimum, the permittee shall maintain aisle space as shown in Figure 11 of the permit application, as required by 40 CFR 264.35.**
 - e. The permittee shall maintain arrangements with state and local authorities as required by 40 CFR 264.37. If state or local officials refuse to enter into preparedness and prevention arrangements with the permittee, the permittee must document this refusal in the operating record.**
- 10. The permittee shall comply with the following conditions concerning the contingency plan:**
- a. The permittee shall immediately carry out the provisions of the contingency plan, Section A-4.b., Part II of the permit application and follow the emergency procedures described by 40 CFR 264.56, whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents which threatens or could threaten human health or the environment. The permittee shall give proper notification if an emergency situation arises and within fifteen (15) days must submit to the Department a written report which includes all information required in 40 CFR 264.56(j).**
 - b. The permittee shall comply with the requirements of 40 CFR 264.53.**
 - c. The permittee shall immediately amend the contingency plan and distribute the amended plan to the appropriate agencies if any criteria in 40 CFR 264.54 are met. Amendments to the plan must be approved in writing by the Department.**
 - d. The permittee shall comply with the requirements of 40 CFR 264.55, concerning the emergency coordinator.**
 - e. The Department of Environmental Regulation's 24-hour emergency telephone number is (904) 488-1320. During normal business hours, the DER District Office may be contacted at (904) 798-4200.**
- 11. The permittee shall comply with the manifest requirements of 40 CFR 264.71, 264.72, and 264.76.**
- 12. The permittee shall maintain a written operating record at the facility which includes the following:**
- the description and quantity of each hazardous waste received**
 - the location of each hazardous waste within the facility, and the quantity at each location**
 - the results of the waste analyses**

PERMITTEE:
Quadrex Environmental Company
1940 N.W. 67th Place
Gainesville, Florida 32606-1649

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12. (continued)

- a summary report and details of incidents that require implementation of the contingency plan
- manifest numbers
- the results of inspections (for 3 years)
- annual certification of waste minimization
- the closure plan and closure cost estimates

These records must be maintained at the facility until completion and certification of closure. [40 CFR 264.73]

13. The permittee shall maintain and operate the facility in accordance with Section D-2, Part I of the permit application (including Figures 8, 9, 10, and 11).
14. The permittee shall install a temporary berm around the compacting area described in Section D-2.c., Part I of the permit application, and immediately implement spill prevention and response measures as described in Section C-13.(b),(c) and (d), Part II of the permit application.
15. The permittee shall maintain compliance with 40 CFR 264, Subpart H - Financial Requirements. All submittals in response to this Specific Condition and Specific Condition IV.4. shall be submitted to:

Financial Coordinator
Hazardous Waste Regulation Section
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

16. All submittals in response to this permit (except Specific Conditions I.15. and IV.4.) shall be submitted in quadruplicate to:

Hazardous Waste Supervisor
Department of Environmental Regulation
3426 Bills Road
Jacksonville, Florida 32207

17. Pursuant to 40 CFR 264.73(b)(9), and Section 3005(h) of RCRA, 42 U.S.C. 6925(h), the permittee must certify, no less often than annually, that:
 - a. The permittee has a program in place to reduce the volume and toxicity of hazardous waste to the degree determined by the permittee to be economically practicable; and
 - b. The proposed method of treatment, storage or disposal is the most practicable method available to the permittee which minimizes the present and future threat to human health and the environment.
 - c. The permittee shall also maintain copies of certification in the facility operating record as required by 40 CFR 264.73(b)(9).

PERMITTEE:

Quadrex Environmental Company
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18. The Waste Minimization program required under Specific Condition I.17.a. and b. above should as a minimum address the following topics:
- a. Identify each hazardous waste stream with the source of generation.
 - b. Types and amounts of hazardous waste that are generated at the facility.
 - c. Present and proposed method of treatment, storage or disposal that is available to the permittee.
 - d. Description of techniques implemented in the past for hazardous waste reduction and their effectiveness.
 - e. An evaluation of technically and economically feasible hazardous waste reduction techniques.
 - f. A program and schedule for implementing the selected hazardous waste reduction technique.
19. 40 CFR Part 268 identifies hazardous wastes that are restricted from land disposal and defines those limited circumstances which an otherwise prohibited waste may continue to be placed on or in a land treatment, storage or disposal unit. The permittee shall maintain compliance with the requirements of 40 CFR Part 268. Where the permittee has applied for an extension, waiver or variance under 40 CFR Part 268 the permittee shall comply with all restrictions on land disposal under this Part once the effective date for the waste has been reached pending final approval of such application.
20. A restricted waste identified in 40 CFR Part 268 Subpart C may be placed in a land disposal unit without further treatment unless the requirements of 40 CFR Part 268 Subparts C and/or D are met.
21. The storage of hazardous wastes restricted from land disposal under 40 CFR Part 268 is prohibited unless the requirements of 40 CFR Part 268 Subpart E are met.
22. All submittals modifying major engineering features of the hazardous waste storage areas shall be worded, signed and certified by a qualified, professional engineer registered in the State of Florida in accordance with 17-730.220(5), FAC.

Part II - Containers

1. The permittee is allowed to store in the approved storage area only the hazardous wastes listed in Attachment A. Containers must conform to DOT specification and be managed in accordance with the approved operation plan. Containers shall be kept closed except when adding or removing waste and shall be handled in a manner that will not allow the containers to rupture or leak, in accordance with 40 CFR 264.173. If a container holding hazardous waste is not in good condition, or begins to leak, the waste shall be transferred to another container in good condition, in accordance with 40 CFR 264.171.
2. The permittee shall use only those containers made of or lined with materials which will not react with and are otherwise compatible with the waste to be stored in them, as indicated in Section B-3, Part II of the permit application.
[40 CFR 264.172]

PERMITTEE:
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Date of Issue: September 28, 1990
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3. The permittee shall conduct weekly visual inspections in accordance with Section B-5, Part II of the permit application (the inspection schedule), to detect leakage in the hazardous waste container storage area or its associated loading/unloading zones. [40 CFR 264.174] If, in spite of the weekly inspections, a significant deterioration of the pavement (due to occasional spills) is noted, the need for a resurfacing/seal material shall be reevaluated.
4. The permittee shall store a maximum of 72,100 gallons of waste in containers in sizes ranging from 1/2 gallon to fifty-five gallons or other D.O.T. approved containers, in the container storage area as shown in Figure 11 of the permit application (revised April 2, 1990).
5. The permittee shall notify the Department when the capacity of the container storage area reaches 90 percent, i.e., volume of 64,900 gallons.
6. For storage of drums larger than fifty-five gallons, the permittee shall not place more than four drums per pallet and shall not stack them more than two high.
7. The permittee shall comply with the waste compatibility requirements of 40 CFR 264.177, as indicated in Section B-3, Part II of the permit application.

Part III: Tanks

1. The permittee is allowed to store in the tank only those hazardous wastes specified in Attachment A.
2. The permittee shall store a maximum of 3,000 gallons of waste in the storage tank.
3. The permittee shall notify the Department when the volume of waste stored in the tank reaches ninety-five (95) percent capacity of the tank, i.e., 2,850 gallons.
4. The permittee shall not place ignitable or reactive waste in tank systems unless the waste is stored in such a way that it is protected from any material or conditions that may cause the waste to ignite or react. [40 CFR 264.198(a)]
5. The permittee shall comply with the protective distance requirements for the tank placement as set forth in Tables 2-1 through 2-6 of the National Fire Protection Association's "Flammable and Combustible Liquids Code" (1977 or 1981), as required by 40 CFR 264.198(b).
6. The permittee shall handle incompatible wastes in accordance with Section C-10, Part II, of the permit application and 40 CFR 264.199, by not introducing hazardous waste into unwashed tank systems which previously held incompatible waste or material.
7. For new tank components which may be required by the repair options of 40 CFR 264.196(f), the permittee must submit a written assessment, reviewed and certified by an independent registered professional engineer, which attests to the component's structural integrity. This assessment shall include the requirements of 40 CFR 264.192. As required in 40 CFR 264.192(b), an independent qualified inspector or independent registered professional engineer must inspect the installation.

PERMITTEE:
Quadrex Environmental Company
1940 N.W. 67th Place
Gainesville, Florida 32606-1649

I.D. Number: FLD 980 711 071
Permit/Certification Number: H0 01-169480
Date of Issue: September 28, 1990
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8. The permittee shall prevent the release of hazardous waste or hazardous constituents to the environment. The secondary containment system should be maintained according to Sections C-7, Part II of the application and shall comply with the requirements of 40 CFR 264.193, including the requirements set forth below:
- a. All new components shall have secondary containment as required by parts (b) and (c) of this condition prior to being put into service.
 - b. The secondary containment system shall meet the requirements of 40 CFR 264.193 and shall be:
 - (1) Updated to prevent any migration of wastes or accumulated liquid to the soil, groundwater or surface waters.
 - (2) Capable of detecting and collecting releases and run-on until the collected material is removed.
 - (3) Lined with materials compatible with the waste to be stored and have sufficient structural strength to sustain the stresses induced by a failure of the primary containment system as well as other stresses which may be induced by the environment.
 - (4) Placed on a foundation or base capable of providing support to the secondary containment system.
 - (5) Provided with leak detection equipment designed and operated to detect failure of either the primary or secondary containment structures or the presence of any release within 24 hours.
 - (6) Sloped or otherwise designed and operated to drain or remove liquids resulting from leaks, spills, or precipitation.
 - (7) Designed and operated, with the exception of double walled tank containment, to contain 100% of the capacity of the largest tank within its boundary and also contain the precipitation due to a 25-year, 24-hour rainfall event, if run-on control is not provided.
 - c. Ancillary equipment shall be provided with secondary containment, except as provided for in 40 CFR 264.193(f).
9. The permittee shall, as part of the general operating requirements of 40 CFR 264.194:
- a. Not place hazardous wastes or treatment reagents in a tank system if the possibility exists that this may cause the tank system to fail.
 - b. Use appropriate controls and practices to prevent spills and overflows, and
 - c. Comply with the requirements of 40 CFR 264.196 if a leak or spill occurs.

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Date of Issue: September 28, 1990
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10. The permittee shall inspect the tank system in accordance with Section C-11, Part II of the permit application and as required by 40 CFR 264.195. These requirements include:
 - a. Developing and following a schedule and procedure for inspecting overfilling controls, and
 - b. Inspecting at least once each operating day the aboveground portions of the tank system, data from leak detection or monitoring equipment, and the construction materials and area immediately surrounding the tank.
 - c. The results of the inspections in (a) and (b), of this condition shall be maintained in the operating record of the facility.
11. The permittee shall follow the procedures outlined in Section C-11, Part II, of the permit application, when a tank system or secondary containment system produces a leak or spill, or is determined to be unfit for use. These requirements include, as they are made applicable by 40 CFR 264.196:
 - a. Cessation of use; prevention of flow or addition of waste.
 - b. Removal of waste from the tank system or secondary containment system.
 - c. Containment of visible releases to the environment.
 - d. Notifications, reports.
 - e. Provision of secondary containment, repair or closure, and
 - f. Certification of major repairs.

Part IV - Closure

1. The permittee shall comply with the following conditions concerning closure:
 - a. The permittee shall close the facility as required by 40 CFR 264.111, and in accordance with the closure plan in Section B-6, C-12, and K, Part II of the permit application.
 - b. The permittee shall amend the closure plan in accordance with 40 CFR 264.112(b) whenever necessary.
 - c. In accordance with 40 CFR 264.112(d)(1), the permittee shall notify the Department at least forty-five (45) days prior to the date he expects to begin closure and submit a complete closure permit application.
[17-730.260(1), FAC]
 - d. Within 90 days after receiving the final volume of hazardous waste, the permittee shall treat or remove all hazardous waste from the site in accordance with the schedule specified in the closure plan, Sections B-6, C-12 and K, Part II, of the permit application, and in accordance with 40 CFR 264.113(a).

PERMITTEE:
Quadrex Environmental Company
1940 N.W. 67th Place
Gainesville, Florida 32606-1649.

I.D. Number: FLD 980 711 071
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1. (continued)

- e. The permittee shall decontaminate and/or dispose of all facility equipment as required by 40 CFR 264.114, 264.197, and the closure plan, Sections B-6, C-12, and K, Part II of the permit application.
2. Within ninety (90) days of the issuance of the permit, the permittee shall close the secondary storage area in accordance with the closure plan dated August 8, 1990 and 40 CFR 264.111.
3. Within thirty (30) days from completion of any closure, the permittee shall submit to the Department by certified mail or hand delivery, a certification signed by the permittee and an independent professional engineer registered in the State of Florida that the facility has been closed in accordance with the permit and specifications of the closure plan. [17-730.220(5) FAC]
4. In addition to the requirements of Specific Condition I.15., the permittee shall revise the closure cost estimate required by 40 CFR 264.142 whenever there is:
 - a change in disposal cost due to changes in the regulations, or
 - a change in the disposal facility.

Part V - Permit Modification/Renewal

1. The Department may modify, revoke and reissue, or terminate for cause, this permit in accordance with the provisions of 17-730.290, FAC. The filing of a request for a permit modification, revocation and reissuance, or termination, or the notification of planned changes or anticipated noncompliance on the part of the permittee does not stay the applicability or enforceability of any permit condition. The permittee may submit any subsequent revisions to the Department for departmental approval. Should these revisions constitute a major modification to the permit, the permittee shall meet the requirements of 17-730.290, FAC.
2. This permit may be reopened if additional information becomes available indicating that the provisions of Section 3004(u) of the Hazardous and Solid Waste Amendments (HSWA) of 1984 apply to this facility. At that time, this permit may be modified to address the requirements of Section 3004(u) of HSWA if the State has been authorized for the provisions, or alternately, the Environmental Protection Agency (EPA) would issued a separate federal permit addressing Section 3004(u) requirements.

PERMITTEE:
Quadrex Environmental Company
1940 N.W. 67th Place
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3. Prior to 135 days before the expiration of this permit, the permittee shall submit a complete application for renewal of the permit on forms and in a manner prescribed by the Department, unless the facility is to be closed prior to the expiration date of this permit per the requirements of FAC 17-730.300(1).

Executed in Jacksonville, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION



Ernest E. Frey, P.E.
Deputy Assistant Secretary

Northeast District
3426 Bills Road
Jacksonville, Florida 32207

ATTACHMENT A

<u>Name</u>	<u>Hazardous Waste Code Number</u>
1,1 Dichloroethane	U076
1,2 Dichloroethane	U077
1,1,1-Trichloroethane	F001/F002/U226
1,1,2-Trichloroethane	F002/U227
1,1,2-Trichlorotrifluoroethane	F001
1,2-Dichlorobenzene	F002/U070
1,4-Dioxane	U108/D001
2-butenal	U053
2-ethoxyethanol(ethylene glycol monoethyl ether)	F005/U359
2-Nitropropane	F005/U171
Acetaldehyde	U001
Acetone	F003/U002
Acetonitrile	U003
Acetophenone	U004
Aniline	U012
Benzene	F005/U019
n-Butyl alcohol	F003/U031
Carbon Disulfide	F005/P022
Carbon Tetrachloride	F001/U211
Chlorobenzene	F002/U037
Chloroform	U044
m-Cresol	F004/U052
o-Cresol	F004/U052
p-Cresol	F004/U052
Cumene	U055
Cyclohexane	U056
Cyclohexanone	F003/U057
o-Dichlorobenzene	U070
m-Dichlorobenzene	U071
p-Dichlorobenzene	U072
Dichloroisopropyl ether	U027
Dipropylamine	U110
Ethanol	D001
Ethyl Acetate	F003/U112
Ethyl Benzene	F003
Ethyl Ether	F003/U117
Ethylene glycol	D001
Formaldehyde	U122
Furan	U124
Heptane	D001
Hexane	D001
Isoamyl alcohol	D001
Isobutyl alcohol	F005/U140
Isoctane/2,2,4-Trimethylpentane	D001
Methane, bromo-	U029
Methane, dibromo	U068
Methane, trichloro	U044
Methanol	F003/U154
Methylene Chloride	F002/U080
Methyl Ethyl Ketone	F005/U159
Methyl Isobutyl Ketone	F003/U161
Methyl Pyrrole	D001

Mineral Spirits	D001
Naphthalene	U165
Nitrobenzene	F004/U169
Nonane	D001
Octane	D001
Propanol	D001
Pentane	D001
Propane,1,2-dichloro	U083
2-Propenal	P003
Propylene glycol	D001
Pyridine	F005/P075/U196
Tetrahydrofuran	U213
1,1,2,2-Tetrachloroethane	U209
1,1,1,2-Tetrachloroethane	U208
Tetrachloroethylene	F001/F002/U210
Toluene	F005/U220
o-Toluidine	U328
m-Toluidine	D001
p-Toluidine	U353
Trichloroethylene	F001/F002/U228
Trichlorofluoromethane	F002/U121
Trichloromethane	U044/D001
m-Xylene	F003/U239
o-Xylene	F003/U239
p-Xylene	F003/U239
Unlisted Ignitable Waste	D001
Spent Solvents	F001
Spent Solvents	F002
Spent Solvents	F003
Spent Solvents	F004
Spent Solvents	F005
Arsenic	D004
Barium	D005
Cadmium	D006
Chromium	D007
Lead	D008
Mercury	D009
Selenium	D010
Silver	D011
Endrin	D012
Lindane	D013
Methoxychlor	D014
Toxaphene	D015
2,4-D	D016
2,4,5-TP Silvex	D017
Benzene	D018
Carbon Tetrachloride	D019
Chlordane	D020
Chlorobenzene	D021
Chloroform	D022
O-Cresol	D023
M-Cresol	D024
P-Cresol	D025
Cresol	D026

Attachment A
Page three

1,4 Dichlorobenzene	D027
1,2 Dichloroethane	D028
1,1 Dichloroethylene	D029
2,4 Dinitrotoluene	D030
Heptachlor	D031
Hexachlorobenzene	D032
Hexachlorobutadiene	D033
Hexachloroethane	D034
Methylethylketone	D035
Nitrobenzene	D036
Pentachlorophenol	D037
Pyridine	D038
Tetrachloroethylene	D039
Trichloroethylene	D040
2,4,5 Trichlorophenol	D041
2,4,6 Trichlorophenol	D042
Vinylchloride	D043

Exhibit D4

RADIOACTIVE MATERIALS LICENSE FOR QUADREX

STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES
OFFICE OF RADIATION CONTROL

911120-1088

RADIOACTIVE MATERIALS LICENSE

Page 1 of 8 Pages
AMENDMENT NO. 28

Pursuant to Chapter 404, Florida Statutes, and Chapter 10D-91, Florida Administrative Code, and in reliance on statements and representations heretofore made by the licensee designated below, a license is hereby issued authorizing such licensee to receive, acquire, possess and transfer the radioactive material(s) designated below and to use such radioactive material(s) for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations and orders of the State of Florida, Department of Health and Rehabilitative Services now or hereafter in effect and to any conditions specified below.

Licensee	With reference to correspondence dated 11/15/91, State of Florida Radioactive Materials 3. License Number: 1354-1 is hereby amended in its entirety to read as follows:
1. Name: QUADREX ENVIRONMENTAL COMPANY	
2. Address: 1940 N.W. 67th Place Gainesville, FL 32606	
	4. Expiration date: November 30, 1995
	5. Category: 4C

- | 6. Radioactive material
(element and mass number) | 7. Chemical and/or physical form | 8. Maximum quantity licensee
may possess at any one time |
|--|---|---|
| A. Any radioactive material with an atomic number 1 through 83. | A. Any sealed source that has been approved for distribution by the U.S. Nuclear Regulatory Commission or an Agreement State. | A. 250 microcuries total; no single source to exceed 10 microcuries each. |
| B. Any radioactive material with an atomic number 84 through 95. | B. Any sealed source that has been approved for distribution by the U.S. Nuclear Regulatory Commission or an Agreement State. | B. 250 microcuries total; no single source to exceed 10 microcuries each. |
| C. Carbon 14 | C. Liquid scintillation materials. | C. See Condition 15, below. |
| D. Hydrogen 3 | D. Liquid scintillation materials. | D. See Condition 15, below. |

(See Page 2)

STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES
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RADIOACTIVE MATERIALS LICENSE
SUPPLEMENTARY SHEET

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License Number 1354-1
AMENDMENT NO. 28
(4C) (K95)

- | | | |
|--|---|---|
| 6. Radioactive material
(element and mass
number) | 7. Chemical and/or
physical form | 8. Maximum quantity
licensee may
possess at any
one time |
| E. Iodine 125
Chromium 51
Iron 59
Sulfur 35
Phosphorus 32
Calcium 45
Sodium 22
Cobalt 57
Zinc 65
Rubidium 86
Gallium 67
Indium 111
Chlorine 36
Mercury 203
Iodine 131
Selenium 75
Germanium 68
Cadium 109
Cerium 141
Scandium 46
Copper 64
Gold 195
Technetium 99
Gadolinium 153
Tin 119
Tin 113
Phosphorus 33 | E. Liquid scintillation
materials. | E. See Condition 15,
below. |
| F. Radon 222 and its
daughter products. | F. Liquid scintillation
material contained
in radon detection
kits only. | F. See Condition 15,
below. |

9. Authorized Use.

- A. and B. To be used as calibration or reference standards.
- C. through F. Liquid scintillation materials shall be received, processed, stored and disposed of in accordance with Condition 15 of this license.

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STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES
OFFICE OF RADIATION CONTROL

RADIOACTIVE MATERIALS LICENSE
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License Number 1354-1
AMENDMENT NO. 28
(4C) (K95)

CONDITIONS

10. A. The authorized place of receipt, storage, use and processing shall be the licensee's facility located at 1940 N.W. 67th Place, Gainesville, Florida 32606.
B. Liquid scintillation fluids may be transported to Oldover Corporation's rotary kiln located at Green Cove Springs, Florida, where they are mixed with the kiln's fuel.
11. Failure to comply with the provisions of this license is a felony of the third degree pursuant to section 404.161, Florida Statutes. Also, violations may warrant an administrative fine of up to \$1,000.00 per violation per day, pursuant to section 404.162, Florida Statutes.
12. A. Licensed material shall be used by or under the supervision of and in the physical presence, at the license facility listed in Item 2, above, of Raymond Thomas, Joseph Owens, Bernhardt Warren, Jack Flaacke, Raymond Whittle, David Gardner, Orin Pelto, Thomas Owens, or Russell Pendleton.
B. The Radiation Safety Officer is Bernhardt C. Warren.
13. The licensee shall comply with the provisions of Chapter 10D-91, Florida Administrative Code, Part X, "Notices, Instructions and Reports to Workers; Inspections" and Part IV, "Standards for Protection Against Radiation."
14. Sealed sources described in Items 6, 7, 8 and 9, Subitems A and B containing licensed material shall not be opened.
15. A. Receipt, possession, storage, processing and disposal of licensed material described in Items 6, 7, 8 and 9, Subitems C and D must satisfy the following:
 1. Be received and processed in concentrations no greater than 0.05 microcuries per gram of medium;
 2. Be transported for disposal to Oldover's Corporation rotary kiln located at Green Cove Springs, Florida in concentrations no greater than 0.05 microcuries per gram of medium.

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STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES
OFFICE OF RADIATION CONTROL

RADIOACTIVE MATERIALS LICENSE
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License Number 1354-1
AMENDMENT NO. 28
(4C) (K95)

15. A. 3. The total activity processed and transported to Oldover's Corporation rotary kiln located in Green Cove Springs, Florida shall not exceed 19.9 curies in a calendar year; and
4. Be received, processed, stored and disposed of in accordance with correspondence described in Condition 22.
- B. Receipt, possession, storage, processing and disposal of licensed material described in Items 6, 7, 8 and 9, Subitems E and F must satisfy the following:
1. Be received and processed in concentrations no greater than 0.05 microcuries per gram of medium;
2. Be transported for disposal to Oldover's Corporation rotary kiln located at Green Cove Springs, Florida, in concentrations no greater than 0.002 microcuries per gram of medium.
3. The total activity processed and transported to Oldover's Corporation rotary kiln located in Green Cove Springs, Florida shall not exceed 100 millicuries in a calendar year; and
4. Be received, possessed, stored, processed and disposed of in accordance with correspondence described in Condition 22.
16. Licensed material described in Items 6, 7, 8 and 9, Subitem C through F, shall not be stored at the licensee's facility located at the address in Item 2, above, for a period greater than 180 days from the date of receipt. The licensee must maintain records of receipt and disposal, including dates, activities and isotopes for inspection by the Department of Health and Rehabilitative Services.
17. Licensed material shall be received, stored and processed in such a manner as to preclude use or access by unauthorized personnel.
18. The licensee shall notify the Department of Health and Rehabilitative Services within 48 hours of customers who submit radioactive materials not in conformance with Condition 15. This 48 hour notification may be made by telephone. The notification shall include the generator's name, address, license number, isotopes, concentrations or activities, and date and description of the materials submitted. This notification shall be made in writing to the Department of Health and Rehabilitative Services within 30 days of the date the materials are submitted to the licensee.

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OFFICE OF RADIATION CONTROL

RADIOACTIVE MATERIALS LICENSE
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License Number 1354-1
AMENDMENT NO. 28
(4C) (K95)

19. The licensee shall notify the Office of Radiation Control at least 48 hours in advance of shipping its low-level radioactive waste to a commercial treatment, storage or disposal facility. Notification shall consist of either calling (407) 297-2095 or writing the Office of Radiation Control, Department of Health and Rehabilitative Services, Post Office Box 680069, Orlando, Florida 32868-0069.
20. Individuals involved in operations which utilize, at any one time or over a three month period, radioiodine in an unsealed form that exceeds the activities specified in Table 1 of the U. S. Nuclear Regulatory Commission's Regulatory Guide 8.20 shall have bioassays performed at the following frequency and follow the corresponding actions:
- A. (I) A bioassay shall be taken within 72 hours of initial use of radioiodine and every 2 weeks thereafter. When work with radioiodine is on an infrequent basis (less frequent than every 2 weeks), a bioassay shall be taken within 10 days of the last day of use.
- (II) The licensee shall take the corresponding actions according to the action levels listed below:
- (a) If the thyroid burden at the time of measurement exceeds 0.12 microcurie of iodine 125 or 0.04 microcurie of iodine 131, the following actions shall be taken:
- (1) An investigation of the operations involved, including air and other facility surveys, shall be carried out to determine the causes of exposure and to evaluate the potential for further exposures.
 - (2) If the investigation indicates that further work in the area might result in exposure of a worker to concentrations that would cause the limiting intakes established in Section 10D-91.404, F.A.C., to be exceeded, the licensee shall restrict the worker from further exposure until the source of exposure is discovered and corrected.
 - (3) Corrective actions that will eliminate or lower the potential for further exposures shall be implemented.

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20. A. (II) (a) (4) A repeat bioassay shall be taken within 2 weeks of the previous measurement and shall be evaluated within 24 hours after the measurement in order to confirm the presence of internal radioiodine and to obtain an estimate of its effective half-life for use in estimating dose commitment.
- (5) Notification reports must be provided as required by Sections 10D-91.426, and 10D-91.428, F.A.C., or as required by conditions of the license pursuant to Section 10D-91.408, F.A.C.
- (b) If the thyroid burden at any time exceeds 0.5 microcurie of iodine 125 or 0.14 microcurie of iodine 131, the following actions shall be taken:
- (1) Carry out all steps described in A.(II)(a) of this condition.
 - (2) As soon as possible, refer the case to appropriate medical consultation for recommendations regarding therapeutic procedures that may be carried out to accelerate removal of radioactive iodine from the body.
 - (3) Carry out repeated measurements at approximately 1-week intervals at least until the thyroid burden is less than 0.12 microcurie of iodine 125 or 0.04 microcurie of iodine 131.
- B. (I) Bioassays may be performed quarterly, if the following conditions are satisfied:
- (a) The average thyroid burden for each individual working in a given area for which bioassays were performed pursuant to Item A.(I), above, was less than 0.12 microcurie of iodine 125, less than 0.04 microcurie of iodine 131 and less than the corresponding proportionate amount of a mixture of these nuclides during the initial 3 month period.

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RADIOACTIVE MATERIALS LICENSE
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License Number 1354-1
AMENDMENT NO. 28
(4C) (K95)

20. B. (I) (b) If measurements of the concentration of radioiodine in air are required as a condition of the license, the quarterly average concentration does not exceed 25 percent of the value for iodine 125, iodine 131 or a proportionate amount of a mixture of these nuclides specified in Table I, Column I of Section 10D-91.429, F.A.C.
- (c) The working conditions during the 3 month period with respect to the potential for exposure are representative of working conditions during the period in which the quarterly bioassay frequency is employed, and there is no reasonable expectation that the criteria given in B.(I)(a) and B.(I)(b) will be exceeded.
- (d) Bioassays shall be randomly distributed over the quarter and will be done within one week after a procedure involving the handling of iodine 125 or iodine 131 to provide a representative assessment of exposure conditions.
- (II) If the thyroid burden exceeds 0.12 microcurie of iodine 125 or 0.04 microcurie of iodine 131, the following actions shall be taken:
- (a) Carry out all steps as described in A.(II)(a) and A.(II)(b) of this condition.
- (b) Reinstitute bioassays every 2 weeks for at least the next three months before reestablishing quarterly bioassays.
21. The licensee shall not transfer possession and/or control of radioactive material, or products containing radioactive material as a contaminant except:
- A. By transfer to a specifically licensed recipient; or
- B. As provided otherwise by specific provision of this license pursuant to the requirements of the "Florida Control of Radiation Hazard Regulations", Chapter 10D-91, Florida Administrative Code.
22. A. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in items 6, 7, 8, and 9 of this license in accordance with state-ments, representations and procedures contained in the licensee's application dated August 27, 1987, signed by Susan E. McDonough, Radiation Safety Officer, and correspondence dated:

(See Page 8)

STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES
OFFICE OF RADIATION CONTROL

RADIOACTIVE MATERIALS LICENSE
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License Number 1354-1
AMENDMENT NO. 28
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22. A. (Continued)


December 11, 1989, signed by Bernhardt C. Warren, Radiation
Safety Officer;
January 16, 1990;
April 6, 1990;
April 13, 1990;
April 13, 1990;
November 15, 1990, all signed by Bernhardt C. Warren, Vice
President, Waste Management & Regulatory Services; and
November 15, 1991. signed by Bernhardt C. Warren, Radiation
Safety Officer.

- B. The licensee shall comply with all applicable requirements of
Chapter 10D-91, Florida Administrative Code, and these regulations
shall supersede the licensee's statements in applications or
correspondence, unless the statements are more restrictive than
the regulations.

For the Office of Radiation Control

Date December 3, 1991

Licensee - White
Central Files - Canary
U.S.N.R.C. - Pink
Office - Canary
Field Files - Pink


J. Daniel Nash
Public Health Physicist Manager

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Exhibit D5

FDER USED OIL REGISTRATION FOR QUADREX

Please refer to the instructions for filling this form before completing it. The information requested here is required by law (Section 3010 of the Resource Conservation and Recovery Act).



Notification of Regulated Waste Activity

United States Environmental Protection Agency

Date Received
(For Official Use Only)

I. Installation's EPA ID Number (Mark X in the appropriate box)

<input type="checkbox"/> A. First Notification	<input checked="" type="checkbox"/> B. Subsequent Notification (complete item C)	C. Installation's EPA ID Number											
		F	L	D	9	8	0	7	1	1	0	7	1

II. Name of Installation (Include company and specific site name)

Q U A D R E X E N V I R O N M E N T A L C O M P A N Y

III. Location of Installation (Physical address not P.O. Box or Route Number)

Street: 1 9 4 0 N W 6 7 t h P L A C E

Street (continued):

City or Town: G A I N E S V I L L E

State: F L ZIP Code: 3 2 6 0 6 -

County Code: A L A C H U A

County Name:

City or Town: G A I N E S V I L L E

State: F L ZIP Code: 3 2 6 0 6 -

County Code: A L A C H U A

County Name:

City or Town: G A I N E S V I L L E

State: F L ZIP Code: 3 2 6 0 6 -

County Code: A L A C H U A

County Name:

City or Town: G A I N E S V I L L E

State: F L ZIP Code: 3 2 6 0 6 -

County Code: A L A C H U A

County Name:

City or Town: G A I N E S V I L L E

State: F L ZIP Code: 3 2 6 0 6 -

County Code: A L A C H U A

County Name:

City or Town: G A I N E S V I L L E

State: F L ZIP Code: 3 2 6 0 6 -

County Code: A L A C H U A

County Name:

City or Town: G A I N E S V I L L E

State: F L ZIP Code: 3 2 6 0 6 -

County Code: A L A C H U A

County Name:

City or Town: G A I N E S V I L L E

State: F L ZIP Code: 3 2 6 0 6 -

County Code: A L A C H U A

County Name:

City or Town: G A I N E S V I L L E

State: F L ZIP Code: 3 2 6 0 6 -

County Code: A L A C H U A

ID: For Official Use Only											

VIII. Type of Regulated Waste Activity (Mark 'X' in the appropriate boxes. Refer to instructions.)

A. Hazardous Waste Activity		B. Used Oil Fuel Activities	
<input type="checkbox"/> 1. Generator (See instructions) a. Greater than 1000 kg/mo (2200 lbs.) b. 100 to 1000 kg/mo (220 - 2200 lbs.) c. Less than 100 kg/mo (220 lbs.) <input type="checkbox"/> 2. Transporter (Indicate Mode in boxes 1-5 below) a. For own waste only b. For commercial purposes Mode of transportation: <input type="checkbox"/> 1. Air <input type="checkbox"/> 2. Rail <input type="checkbox"/> 3. Highway <input type="checkbox"/> 4. Water <input type="checkbox"/> 5. Other (specify) _____	<input type="checkbox"/> 3. Treater, Storer, Disposer (at installation) Note: A permit is required for this activity. See instructions. <input type="checkbox"/> 4. Hazardous Waste Fuel a. Generator/Marking to Burner b. Other Markers: <input type="checkbox"/> 1. Utility Boiler <input type="checkbox"/> 2. Industrial Boiler <input type="checkbox"/> 3. Industrial Furnace <input type="checkbox"/> 4. Other (specify) _____ <input type="checkbox"/> 5. Underground Injection Control	<input type="checkbox"/> 1. Oil Specification Used Oil Fuel a. Generator/Marking to Burner b. Other Markers: <input type="checkbox"/> 1. Utility Boiler <input type="checkbox"/> 2. Industrial Boiler <input type="checkbox"/> 3. Industrial Furnace <input type="checkbox"/> 4. Other (specify) _____ <input checked="" type="checkbox"/> 2. Specification Used Oil Fuel Marking (for On-site Burner) (No First Claim) the Oil Meets the Specification	

IX. Description of Regulated Wastes (Use additional sheets if necessary)

A. Characteristics of Nonlisted Hazardous Wastes. Mark 'X' in the boxes corresponding to the characteristics of nonlisted hazardous wastes your installation handles. (See 40 CFR Parts 261.20 - 261.24)

1. Ignitable (D001)	2. Corrosive (D002)	3. Reactive (D003)	4. EP-Toxic (D004)	List specific EPA hazardous waste number(s) for the EP-Toxic contaminant(s)			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B. Listed Hazardous Wastes. (See 40 CFR 261.31 - 33. See instructions if you need to list more than 12 waste codes.)

1	2	3	4	5	6
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	8	9	10	11	12
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C. Other Wastes. (State or other wastes requiring an I.D. number. See instructions.)

1	2	3	4	5	6
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

X. Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

Signature <i>Dennis L. Fleetwood</i>	Name and Official Title (type or print) Dennis L. Fleetwood, Mgr. Reg. Comp.	Date Signed 5/24/91
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XI. Comments

* Company name changed from Quadrex HPS to Quadrex Environmental Company

Note: Mail completed form to the appropriate EPA Regional or State Office. (See Section III of the booklet for addresses.)



Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Carol M. Browner, Secretary

Ben C. Warren
Quadrex Corporation
P.O. Box 4100
Gainesville, FL 32613

July 20, 1991

BE IT KNOWN THAT
Quadrex Corporation
IS HEREBY REGISTERED AS A USED OIL
COLLECTION FACILITY

in compliance with Chapter 17-710, Florida Administrative Code (F.A.C.).

The Department of Environmental Regulation hereby issues
registration number 50428-UO on July 1, 1991.

This registration will expire June 30, 1992.

This certificate documents receipt of your annual registration and annual report. It shall be displayed in a prominent place at your facility. This certificate and your cancelled check are your receipts.

Betsy Galocy
Used Oil Recycling Manager
Hazardous Waste Reduction & Management Section

Exhibit E1

LIST OF PERMITS, LICENSES, OR AUTHORIZATIONS PERTAINING TO RAMP

List of permits, licenses, or authorizations pertaining to RAMP				
Type	Number	Issue date	Expiration date	Issued by
Radioactive Materials License	Colo. 523-01	August 2, 1990	November 30, 1992	Colorado Dept. of Public Health Radiation Control Division 4210 East 11th Avenue Denver, CO 80220
TSD Type A - Interim Status	Application submitted	January 26, 1988		Colorado Dept. Public Health Waste Management Division
EPA Generators Number	COD 98 071 8985	None specified	None specified	Colorado Dept. Public Health Waste Management Division

Exhibit E2

RADIOACTIVE MATERIALS LICENSE FOR RAMP

STATE OF COLORADO
DEPARTMENT OF PUBLIC HEALTH

RADIOACTIVE MATERIALS LICENSE

Pursuant to the Radiation Control Act Title 25, Article 11, CRS 1989, Replacement Volume, as amended, and the Radiation Control Regulations, Part 3, and in reliance on statements and representations heretofore made by the licensee designated below; a license is hereby issued authorizing such licensee to transfer, receive, possess and use the radioactive material(s) designated below; and to use such radioactive material(s) for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations, and orders now or hereafter in effect of the Colorado Department of Health and to any conditions specified below.

Licensee		3. In accordance with the letter dated November 6, 1991 license number Colo. 523-01 is amended in its entirety.
1. Name: Ramp Industries, Inc.		
2. Address: 1127 West 46th Avenue Denver, Colorado 80211		4. Expiration date: November 30, 1992
		5. Reference number: —

6. Radioactive materials (element and mass no.)	7. Chemical and/or physical form	8. Maximum quantity licensee may possess at any one time
A. Any radioactive material with Atomic Nos. 3-88, inclusive, with a half-life of 120 days or less, except as specified below.	A. Any	A. 250 Curies
B. Any radioactive material with Atomic Nos. 89, 90, 94, 95, 96, and 100 with a half-life of 120 days or less, except as specified below.	B. Any	B. 20 millicuries
C. Any radioactive material with Atomic Nos. 4-88, inclusive, with a half-life of more than 120 days, except as specified below.	C. Sealed Sources, Plated Sources, or Foils	C. 3 Curies

STATE OF COLORADO
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(Expiration Date: November 30, 1992)
Amendment No. 12

6. Radioactive materials (element and mass no.)	7. Chemical and/or physical form	8. Maximum quantity licensee may possess at any one time
D. Any radioactive material with Atomic Nos. 3-89 inclusive, and 91, with a half-life of more than 120 days, except as specified below.	D. Any	D. 3 Curies
E. Any radioactive material having atomic nos. 93, 95, 96, 97, 98, and 99 with a half-life greater than 120 days.	E. Any	E. 20 microcuries
F. Special nuclear material	F. Any	F. 10 grams
G. Source Material	G. Any	G. 250 kilograms
H. Natural and Depleted Uranium	H. Any	H. 500 kilograms
I. Hydrogen 3	I. Any	I. 10 curies
J. Hydrogen 3	J. Sealed Sources, foils, and exit signs	J. 150 curies
K. Carbon 14	K. Any	K. 500 millicuries
L. Cobalt 57	L. Any	L. 200 millicuries
M. Cobalt 60	M. Sealed Sources	M. 10 curies
N. Nickel 63	N. Sealed Sources	N. 2 curies
O. Zinc 65	O. Sealed Sources plated sources or foils	O. 100 millicuries

OR-RH-18

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6. Radioactive materials (element and mass no.)	7. Chemical and/or physical form	8. Maximum quantity licensee may possess at any one time
P. Strontium 90	P. Sealed Sources	P. 3 curies
Q. Cadmium 109	Q. Sealed Sources	Q. 100 millicuries
R. Silver 110m	R. Sealed Sources plated sources or foils	R. 50 millicuries
S. Iodine 129	S. Sealed Sources	S. 10 millicuries
T. Cesium 137	T. Sealed Sources	T. 5 curies
U. Promethium 147	U. Sealed Sources	U. 10 curies
V. Gadolinium 153	V. Sealed Sources	V. 3 curies
W. Polonium 210	W. Sealed Sources plated sources or foils	W. 500 millicuries
X. Lead 210	X. Sealed Sources plated sources or foils	X. 350 millicuries
Y. Radium 226	Y. Any	Y. 100 millicuries
Z. Radium 226	Z. Sealed Sources	Z. 900 millicuries
AA. Americium 241	AA. Sealed Sources plated sources or foils	AA. 500 millicuries
BB. Cesium 137	BB. Sealed Sources	BB. 1 source, not to exceed 1.2 curies

STATE OF COLORADO
DEPARTMENT OF PUBLIC HEALTHRADIOACTIVE MATERIALS LICENSELicense Number Colo. 523-01
(Expiration Date: November 30, 1992)
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CONDITIONS

- 9.A. The licensee may receive, pick-up, transport, store, solidify, subject to absorption and/or compaction, consolidate, package, and repackage radioactive material authorized in Items 6.A., 6.C., 6.D., 6.G., 6.H., 6.I., 6.K., 6.L., and 6.Y. as waste, in approved Department of Transportation (D.O.T.) shipping containers. Disposal of waste shall be made by transfer to authorized recipients.
- B. Radioactive material authorized in Items 6.B., 6.E., and 6.F. shall be received, solidified, packaged, and transferred to authorized recipients for disposal. Prior approval must be granted by the Radiation Control Division for any processing of special nuclear material.
- C. Radioactive material authorized in Items 6.J., 6.M. through 6.X., 6.Z., and 6.AA. shall be received, packaged, and transferred to authorized recipients for disposal.
- D. Radioactive material authorized in Item 6.BB. shall be used for survey instrument calibration.
10. Radioactive material shall be used only at 1031, 1107, and 1127 West 46th Avenue, Denver, Colorado, 80211.
11. The licensee shall comply with the provisions of the State of Colorado Rules and Regulations Pertaining to Radiation Control, Part 10, "Notices, Instructions and Reports to Workers; Inspections" and Part 4, "Standards for Protection Against Radiation".
12. Radioactive material shall be used by, or under the supervision of John E. Lucas, Ray Allen, Gregory D. Smith, or Jack F. Patterson.
- 13.A. The designated Radiation Safety Officer is John E. Lucas.
- B. The designated Alternate Radiation Safety Officer is Ray Allen.
14. Radioactive material authorized by Item 6. of this license shall be stored and used in a manner that will preclude use by unauthorized personnel.
15. A total volume of 6375 cubic feet or 850 55-gallon drums of radioactive material may be possessed by RAMP Industries, Inc. This volume includes processed waste, unprocessed waste, waste in storage for decay, regulated scintillation fluids, and all other radioactive materials.

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DEPARTMENT OF PUBLIC HEALTHRADIOACTIVE MATERIALS LICENSELicense Number Colo. 523-01
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16. No radioactive waste may be received for which there is no current disposal option.
17. Any radioactive waste must be returned to the generator if:
 - A. it is determined to be a mixed waste which cannot be stored for decay to background; or
 - B. it is not acceptable at a commercial low level waste disposal site.
18. The licensee is authorized to perform tests for leakage and/or contamination upon sealed sources containing radioactive material and upon devices which contain such sealed sources.
- 19.A. (1) Radioactive material authorized in Item 6.BB. shall be tested for leakage and/or contamination at intervals not to exceed six (6) months.

(2) In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, a sealed source received from another person shall not be put into use until tested.
- B. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Department.
- C. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Department regulations. A report shall be filed within 5 days of the test with the Director, Radiation Control Division, Colorado Department of Health, 4210 East 11th Avenue, Denver, Colorado 80220, describing the equipment involved, the test results, and the corrective action taken.
- D. Tests for leakage and/or contamination shall be performed by the licensee or by other persons specifically authorized by the U.S. Nuclear Regulatory Commission or an Agreement State to perform such services.
20. Sealed sources containing radioactive material shall not be opened.
- 21.A. Radioactive material authorized in Item 6.A. shall not be stored for a period exceeding 42 months.

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- 21.B. (1) Radioactive material authorized in Items 6.B. through 6.H. and Items 6.N. through 6.O. (except Iridium 192 sealed sources) shall not be in the licensee's possession for a period greater than twenty-four (24) months from the date of pick-up or receipt.
- (2) Sealed sources containing Iridium 192 shall not be in the licensee's possession for a period greater than thirty-six (36) months from the date of pick-up or receipt.
- C. The licensee may also hold unsealed radioactive material for in-storage decay for a period of thirty-six (36) months from the date of receipt or 10 half-lives of the longest-lived radioactive material, whichever is shorter.
- 22.A. Individuals involved in operations which utilize, at any one time, more than 50 millicuries of I-125 and/or I-131 or unvented laboratory operations involving 10 mCi of I-125 and/or I-131 in a noncontained form shall have bioassays performed within one week following a single operation. Records of the bioassays shall be maintained for inspection by the Department and the action points listed below shall be observed.
- B. Whenever the thyroid burden at the time of measurement exceeds 0.12 microcuries of I-125 or 0.04 microcuries of I-131, the following actions shall be taken:
- (1) An investigation of the operations involved, including ventilation surveys shall be carried out to determine the causes of exposure and to evaluate the potential for further exposures.
- (2) If the investigation indicates that further work in the area might result in exposure of a worker to concentrations that are excessive, the licensee shall restrict the worker from further exposure until the source of exposure is discovered and corrected.
- (3) Corrective actions that will eliminate or lower the potential for further exposures shall be implemented.
- (4) A repeat bioassay shall be taken within 1 week of the previous measurement in order to confirm the effectiveness of the corrective action taken or to verify internal radioiodines present.
- (5) Reports or notification shall be provided as required by RH 4.29 and 4.34 of the State of Colorado Rules and Regulations Pertaining to Radiation Control.

STATE OF COLORADO
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RADIOACTIVE MATERIALS LICENSE

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22.C. If the thyroid burden at any time exceeds 0.5 microcuries of I-125 or 0.14 microcuries of I-131, the following actions shall be taken:

(1) Prevent the individual from any further handling of I-125 or I-131 until the thyroid burden is below the above limits.

(2) As soon as possible, refer the case to appropriate medical consultation for recommendations regarding therapeutic procedures that may be carried out to accelerate removal of radioactive iodine from the body. This should be done within 2-3 hours after exposure when the time of exposure is known so that any prescribed thyroid blocking agent would be effective.

(3) Carry out repeated measurements at approximately 1-week intervals at least until the thyroid burden is less than 0.12 microcuries of I-125 or 0.04 microcuries of I-131.

23.A. Individuals involved in operations which utilize, at any one time, more than 100 millicuries of Hydrogen 3 in a non-contained form, other than metallic foil, shall have bioassays performed within one week following a single operation and at weekly intervals for continuing operations. Records of the bioassays shall be maintained for inspection by the Department and the action points listed below shall be observed.

B. (1) Tritium shall not be used in such a manner as to cause any individual to receive a radiation exposure such that urinary excretion rates exceed 28 microcuries of tritium per liter when averaged over a calendar quarter.

(2) Urinalysis shall be performed at weekly intervals on all individuals who work in the restricted areas of facilities in which tritium is used. If the average concentration of tritium in urine for any single individual during a calendar quarter is less than 10 microcuries per liter, urinalysis may be performed on that individual at monthly intervals for the following calendar quarter and may continue at monthly intervals so long as the average concentration in the calendar quarter remains below 10 microcuries per liter. The urine specimen shall be collected on the same day of the week insofar as possible.

(3) A report of an average concentration in excess of the limit specified in B. (1) above for any individual shall be filed, in writing, within thirty (30) days of the end of the calendar quarter with the Director, Radiation Control Division, Colorado Department of Health, 4210 East 11th Avenue, Denver, Colorado 80220. The report shall contain the results of all urinalyses for the individual during the calendar quarter, the cause of the excessive concentrations, and the corrective steps taken or planned to assure against a recurrence.

(4) Any single urinalysis which discloses a concentration of greater than 50 microcuries per liter shall be reported, in writing, within seven (7) days of the licensee's receipt of the results, to the Director, Radiation Control Division, Colorado Department of Health, 4210 East 11th Avenue, Denver, Colorado 80220.

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DEPARTMENT OF PUBLIC HEALTH
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- 24.A. The licensee may transport radioactive material or deliver radioactive material to a carrier for transport, in accordance with the provisions of RH 17.5 of the State of Colorado Rules and Regulations Pertaining to Radiation Control, "Transportation of Licensed Material".
- B. The licensee is authorized to transport radioactive material for eventual transfer to persons licensed by the U.S. Nuclear Regulatory Commission or an Agreement State to perform radioactive waste disposal services, and that are transported in accordance with RH 17.5 of the State of Colorado Rules and Regulations Pertaining to Radiation Control.
- C. The transportation of Colorado radioactive materials shall be subject to all applicable regulations of the Colorado Public Utilities Commission, Colorado Department of Highways, Colorado Department of Public Safety, Colorado Department of Revenue (Port of Entry), U.S. Department of Transportation, and other agencies of the United States having jurisdiction. When the U.S. Department of Transportation Regulations (Title 49, Chapter I, Code of Federal Regulations) are not applicable to shipments by land of Colorado radioactive material by reason of the fact that the transportation does not occur in interstate or foreign commerce, the licensee must be in compliance with the requirements relating to packaging of the radioactive material, marking and labeling of the package, placarding of the transport vehicle, and accident reporting set forth in the regulations of the U.S. Department of Transportation.
- 25.A. The licensee shall maintain in force a surety pursuant to RH 3.9.5.1 of the Regulations for the decommissioning and decontamination at the site and buildings at the storage area. This surety is subject to yearly review for adequacy by the Department.
- B. The decommissioning and decontamination surety shall be maintained sufficient to fully comply with all conditions of this License, the Regulations, and 6 CCR 1007-1. The Surety Agreement entered into between the licensee and the State is hereby incorporated by reference as a condition of the license.
- C. As of April 30, 1992, a surety of \$11,654.37 must be on deposit for RAMP Industries in a trust account with Central Bank National Association.
- D. As of June 30, 1991 a surety of \$92,588.56 must be on deposit with the Department for RAMP Industries.
- D. Additions to the surety account in the amount of \$5,000.00 shall be made by RAMP Industries on a quarterly basis.

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26. The transportation of radioactive materials within the DOT Specification 20WC packaging shall be in accordance with the limitations and requirements specified in the DOT-E 9581 exemption.
27. Within three months of the issuance of this license or amendment the licensee must furnish this Division evidence of the licensee's ability to lawfully dispose of the Radium source(s) possessed by the licensee. The evidence must include the name and address of the company/licensee to which the source(s) would be sent for disposal during the period of time this license is valid. The evidence must also include the ability of the receiving company/licensee to receive such source(s). The ability to dispose of the Radium source(s), and documents supporting that ability, must be maintained by the licensee until lawful disposal of the Radium source(s) has been completed.
28. All low-level radioactive waste, which was generated outside the Rocky Mountain Compact Region and was imported into the Compact Region by Ramp Industries, Inc., shall be removed from the Compact Region prior to January 1, 1993.
29. Prior to the use of licensed materials outside the State of Colorado the licensee shall comply with the applicable provisions of 10 CFR 150.20 or if the use shall take place in an Agreement State the licensee shall comply with the applicable provisions of that State's reciprocity requirements.
30. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive materials described in Items 6., 7., and 8. of this license in accordance with statements, representations, and procedures contained in:
 - A. The applications and attachments dated October 28, 1987; November 25, 1987 (mR services); and
 - B. The license correspondence and attachments dated November 15, 1982; June 8, 1983; November 6, 1984; December 10, 1985; February 16, 1988; and February 17, 1988; March 9, 1990; March 15, 1990; April 5, 1990; August 2, 1990; August 22, 1990; January 31, 1991; March 14, 1991; November 6, 1991; December 10, 1991; December 19, 1991; January 9, 1992; and February 28, 1992; and
 - C. The Ramp Industries Contingency Plan (received November 27, 1987).

The State of Colorado Rules and Regulations Pertaining to Radiation Control shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

FOR THE COLORADO DEPARTMENT OF HEALTH

Date May 22, 1992
OR-RH-18By W. Lamb

(fill-in areas are spaced for elite type, i.e., 12 characters/inch).

FORM 1 GENERAL		U.S. ENVIRONMENTAL PROTECTION AGENCY GENERAL INFORMATION Consolidated Permits Program (Read the "General Instructions" before starting.)		I. EPA I.D. NUMBER F C O D 9 8 0 7 1 8 9 8 S	
EPA I.D. NUMBER		PLEASE PLACE LABEL IN THIS SPACE		GENERAL INSTRUCTIONS If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, or through it and enter the correct data in appropriate fill-in area below. Also, if any the preprinted data is absent (the area to left of the label space lists the information that should appear), please provide it in proper fill-in area(s) below. If the label is complete and correct, you need not complete items I, III, V, and VI (except VI-B which must be completed regardless). Complete items if no label has been provided. Refer the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.	
III. FACILITY NAME					
V. FACILITY MAILING ADDRESS					
VI. FACILITY LOCATION					
II. POLLUTANT CHARACTERISTICS					
INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.					
SPECIFIC QUESTIONS		MARK "X" YES NO ATTACHED		SPECIFIC QUESTIONS	
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		<input checked="" type="checkbox"/>		B. Does or will this facility (either existing or proposed) include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)		<input checked="" type="checkbox"/>		D. Is this a proposed facility (other than those described in A or B above) which will result in a discharge to waters of the U.S.? (FORM 2D)	
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)		<input checked="" type="checkbox"/>		F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		<input checked="" type="checkbox"/>		H. Do you or will you inject at this facility fluids for special processes such as: mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		<input checked="" type="checkbox"/>		J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)	
III. NAME OF FACILITY					
1 RAMP INDUSTRIES, INCORPORATED					
IV. FACILITY CONTACT					
A. NAME & TITLE (last, first, & title)			B. PHONE (area code & no.)		
2 LUCAS JOHN E. MANAGER			303 480 1509		
V. FACILITY MAILING ADDRESS					
A. STREET OR P.O. BOX					
3 1127 WEST 46th AVE.					
B. CITY OR TOWN					
4 DENVER					
C. STATE					
CO					
D. ZIP CODE					
80211					
VI. FACILITY LOCATION					
A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER					
5 1127 WEST 46th AVE.					
B. COUNTY NAME					
DENVER					
C. CITY OR TOWN					
6 DENVER					
D. STATE					
CO					
E. ZIP CODE					
80211					
F. COUNTY CODE (if known)					

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)

A. FIRST				B. SECOND			
7	9	9	9	7			
(specify) Non-Classifiable				(specify)			
C. THIRD				D. FOURTH			
				7			
(specify)				(specify)			

VIII. OPERATOR INFORMATION

A. NAME												B. Is the name listed in Item VIII-A also the owner?																					
RAMP INDUSTRIES INCORPORATED												<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO																					
C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)														D. PHONE (area code & no.)																			
F = FEDERAL				M = PUBLIC (other than federal or state)				(specify)				A		3		0		3		4		8		0		1		4		8		1	
S = STATE				O = OTHER (specify)																													
P = PRIVATE																																	
E. STREET OR P.O. BOX																																	
1127 WEST 46th AVENUE																																	
F. CITY OR TOWN														G. STATE				H. ZIP CODE				IX. INDIAN LAND											
DENVER														CO				80211				Is the facility located on Indian lands?											
																						<input type="checkbox"/> YES <input type="checkbox"/> NO											

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)										D. PSD (Air Emissions from Proposed Sources)									
9 INI										9 PI									
B. UIC (Underground Injection of Fluids)										E. OTHER (specify)									
9 IUI										(specify)									
C. RCRA (Hazardous Wastes)										F. OTHER (specify)									
9 IRI										SEE ATTACHMENTS									

MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

See Attachments

XIII. CERTIFICATION (see instructions)

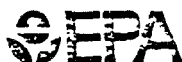
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)		B. SIGNATURE		C. DATE SIGNED	
Daniel E. Caulk President		Daniel E. Caulk President		1-26-88	

COMMENTS FOR OFFICIAL USE ONLY

(Fill in areas are spaced for ease of use, i.e., 12 characters minimum)

FORM
3
RCRA



U.S. ENVIRONMENTAL PROTECTION AGENCY
HAZARDOUS WASTE PERMIT APPLICATION
Consolidated Permits Program
(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER

Flc 009807189851

FOR OFFICIAL USE ONLY

APPLICATION DATE RECEIVED
APPROVED (yr, mo., & day)

COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below (mark one box only) to indicate whether this is the first application you are submitting for your facility or revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in item I above.

A. FIRST APPLICATION (place an "X" below and provide the appropriate date)

☒ 1. EXISTING FACILITY (See instructions for definition of "existing" facility. Complete item below.)

☐ 2. NEW FACILITY (Complete item below.)

FOR EXISTING FACILITIES, PROVIDE THE DATE (yr, mo., & day) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED (use the boxes to the left)

FOR NEW FACILITY PROVIDE THE DATE (yr, mo., & day) OPERATION BEGAN OR IS EXPECTED TO BEGIN

B. REVISED APPLICATION (place an "X" below and complete item I above)

☐ 1. FACILITY HAS INTERIM STATUS

☐ 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES - CODES AND DESIGN CAPACITIES

A. PROCESS CODE - Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, the describe the process (including its design capacity) in the space provided on the form (Item III-C).

B. PROCESS DESIGN CAPACITY - For each code entered in column A enter the capacity of the process.

1. AMOUNT - Enter the amount.

2. UNIT OF MEASURE - For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PR	APPROPRIATE UNITS OF MEASURE FOR PROCESS	PROCESS	PRO-CESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS
Storage:			Treatment:		
CONTAINER (barrel, drum, etc.)	S01	GALLONS OR LITERS	INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
TANK	S02	GALLONS OR LITERS	OTHER (Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)	T04	GALLONS PER DAY OR LITERS PER DAY
WASTE PILE	S03	CUBIC YARDS OR C METERS			
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS			
Disposal:					
INJECTION WELL	D79	GALLONS OR LITERS			
LANDFILL	D80	ACRE-FEET (the volume that would cover one acre to a depth of one foot) OR HECTARE-METER			
LAND APPLICATION	D81	ACRES OR HECTARES			
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY			
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS			
UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT MEAS: CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	
LITERS	L	TONS PER HOUR	D	HECTARE-METER	
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	
GALLONS PER DAY	U	LITERS PER HOUR	H		

EXAMPLE FOR COMPLETING ITEM III (shown in line numbers X-1 and X-2 below): A facility has two storage tanks, one tank can hold 200 gallons and other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
C	DUP																
LINE NUMBER	A. PRO-CESS CODE (from list above)	B. PROCESS DESIGN CAPACITY	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PRO-CESS CODE (from list above)	B. PROCESS DESIGN CAPACITY	FOR OFFICIAL USE ONLY										
		1. AMOUNT (specify)	2. UNIT OF MEASURE (enter code)			1. AMOUNT	2. UNIT OF MEASURE (enter code)										
X-1	S02	600	G	5													
X-2	T03	20	E	6													
1	S01	06	G	7													
2	S01	750	G	8													
3	T01	262.5	G	9													
4				10													

III. PROCESSES (continued)

C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESSES (code "T04"). FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

SEE ATTACHMENTS

IV. DESCRIPTION OF HAZARDOUS WASTES

A. EPA HAZARDOUS WASTE NUMBER — Enter the four-digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four-digit number(s) from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. ESTIMATED ANNUAL QUANTITY — For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE — For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS.....	P	KILOGRAMS.....	K
TONS.....	T	METRIC TONS.....	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:

For listed hazardous waste: For each listed hazardous waste entered in column A select the code(s) from the list of process codes contained in Item III to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non-listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code(s) from the list of process codes contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that possess that characteristic or toxic contaminant.

Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code(s).

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER — Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B, C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING ITEM IV (shown in line numbers X-1, X-2, X-3, and X-4 below) — A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARDOUS WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES	
				1. PROCESS CODES (enter)	2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K 0 5 4	900	P	T 0 3 D 8 0	
2	D 0 0 2	400	P	T 0 3 D 8 0	
X-3	D 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2				included with above

Continued from page 2.

NOTE: Photocopy this page before completing if you have more than 25 wastes to list.

Form Approved OMB No. 158-S30004

EPA I.D. NUMBER (enter from page 1)										FOR OFFICIAL USE ONLY									
W 0 0 0 0 7 1 8 0 8 5										W 1 2 D U P									
IV. DESCRIPTION OF HAZARDOUS WASTES (continued)																			
LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)		B. ESTIMATED ANNUAL QUANTITY OF WASTE		C. UNIT OF MEASURE (enter code)	D. PROCESSES													
						1. PROCESS CODES (enter)					2. PROCESS DESCRIPTION (if a code is not entered in D(1))								
1	F	0	0	3	20,000	G	S	0	1										
2	F	0	0	5	Included in above	G	S	0	1										
3	D	0	0	1	Included in above	G	S	0	1										
4																			
5																			
6																			
7																			
8																			
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16																			
17																			
18																			
19																			
20																			
21																			
22																			
23																			
24																			
25																			
26																			

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 3.

EPA I.D. NO. (enter from page 1)

F C 0 1 D 9 8 0 7 1 8 9 8 5 6

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility (see instructions for more detail).

VI. PHOTOGRAPHS

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).

V. FACILITY GEOGRAPHIC LOCATION

LATITUDE (degrees, minutes, & seconds)

LONGITUDE (degrees, minutes, & seconds)

3 9 4 6 4 9 N

1 0 5 0 0 0 0 W

VIII. FACILITY OWNER

☐ A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER

2. PHONE NO. (area code & no.)

E RAMP Industries Inc

3 0 3 - 4 8 0 - 1 5 0 0

3. STREET OR P.O. BOX

4. CITY OR TOWN

5. ST.

6. ZIP CODE

F 1127 West 46th Avenue

G Denver

C 0

8 0 2 1 1

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME (print or type)

Daniel E. Caulk

B. SIGNATURE

Daniel E. Caulk President

C. DATE SIGNED

1-26-88

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME (print or type)

Daniel E. Coulk

B. SIGNATURE

Daniel E. Coulk President

C. DATE SIGNED

1-26-88

Exhibit E4

HAZARDOUS WASTES ACCEPTABLE FOR RECEIPT AT RAMP

1.3 EPA Waste Codes Accepted

The RAMP facility receives RCRA waste in the following EPA waste codes:

- D001 Wastes meeting ignitability criteria per Section 251.21.

- F003 Spent nonhalogenated solvents (xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol) and still bottoms from their recovery.

- F005 Spent nonhalogenated solvents (toluene, methyl ethyl ketone, carbon disulfide, isobutanol, and pyridine) and still bottoms from recovery.

Exhibit F1

**LIST OF PERMITS, LICENSES, OR AUTHORIZATIONS
PERTAINING TO ENVIROCARE**

List of permits, licenses, or authorizations pertaining to Envirocare				
Type	Number	Issue date	Expiration date	Issued by
Radioactive Materials License	UT 2300249	August 1989	February 28, 1996	Utah Dept. of Environmental Quality Division of Radiation Control
TSD Type B - Hazardous Waste Permit	UTD 98 259 8898	November 30, 1990	November 30, 2000	Utah Dept. of Environmental Quality Division of Solid & Hazardous Waste
EPA Generators Number	UTD 98 259 8898	March 3, 1989	NA	Utah Dept. of Environmental Quality Division of Solid & Hazardous Waste

Exhibit F2

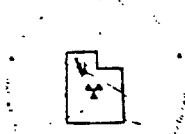
RADIOACTIVE MATERIALS FOR LICENSE FOR ENVIROCARE

UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE

Pursuant to Section 19-3-104 of the Utah Code Annotated 1953, and the Utah Department of Environmental Quality Rules for the Control of Ionizing Radiation, and in reliance of statements and representations heretofore made by the licensee designated below, a license is hereby issued authorizing such licensee to transfer, receive, possess and use the radioactive material designated below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, and orders now or hereafter in effect and to any conditions specified below.

LICENSEE)	3. License Number
)	UT 2300249
1. Name	Envirocare of Utah, Inc.)	Amendment #11, in its entirety
)	
2. Address	215 South State Street)	4. Expiration Date
	Suite 1160)	February 28, 1996
	Salt Lake City, Utah 84111)	
)	5. License Category 4-a

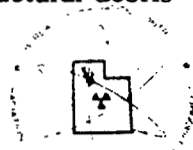
6. Radioactive Material (Element and Mass Number)	7. Chemical and/or Physical Form	8. Maximum Concentration In Waste for Disposal
A. Silver-110m	A. Volumetric bulky materials or structural debris	A. 5.6E+02 pCi/g
B. Americium-241	B. Volumetric bulky materials or structural debris	B. 2.3E+02 pCi/g
C. Americium-243	C. Volumetric bulky materials or structural debris	C. 1.7E+03 pCi/g
D. Beryllium-7	D. Volumetric bulky materials or structural debris	D. 3.8E+04 pCi/g
E. Calcium-45	E. Volumetric bulky materials or structural debris	E. 4.0E+08 pCi/g
F. Cadmium-109	F. Volumetric bulky materials or structural debris	F. 4.6E+04 pCi/g
G. Cobalt-56	G. Volumetric bulky materials or structural debris	G. 3.6E+02 pCi/g
H. Cobalt-57	H. Volumetric bulky materials or structural debris	H. 1.9E+04 pCi/g



UTAH DIVISION OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEET

License # UT 2300249

6. Radioactive Material (Element and Mass Number)	7. Chemical and/or Physical Form	8. Maximum Concentration In Waste for Disposal
I. Cobalt-58	I. Volumetric bulky materials or structural debris	I. 1.6E+03 pCi/g
J. Cobalt-60	J. Volumetric bulky materials or structural debris	J. 3.6E+02 pCi/g
K. Chromium-51	K. Volumetric bulky materials or structural debris	K. 6.8E+04 pCi/g
L. Cesium-134	L. Volumetric bulky materials or structural debris	L. 1.2E+03 pCi/g
M. Cesium-137	M. Volumetric bulky materials or structural debris	M. 5.6E+02 pCi/g
N. Europium-152	N. Volumetric bulky materials or structural debris	N. 1.7E+03 pCi/g
O. Europium-154	O. Volumetric bulky materials or structural debris	O. 1.4E+03 pCi/g
P. Iron-55	P. Volumetric bulky materials or structural debris	P. 1.8E+06 pCi/g
Q. Mercury-203	Q. Volumetric bulky materials or structural debris	Q. 1.0E+04 pCi/g
R. Potassium-40	R. Volumetric bulky materials or structural debris	R. 1.0E+04 pCi/g
S. Iridium-192	S. Volumetric bulky materials or structural debris	S. 2.5E+03 pCi/g
T. Manganese-54	T. Volumetric bulky materials or structural debris	T. 5.6E+03 pCi/g



UTAH DIVISION OF RADIATION CONTROL
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6. Radioactive Material (Element and Mass Number)	7. Chemical and/or Physical Form	8. Maximum Concentration In Waste for Disposal
U. Niobium-94	U. Volumetric bulky materials or structural debris	U. 1.6E+02 pCi/g
V. Nickel-59	V. Volumetric bulky materials or structural debris	V. 7.0E+02 pCi/g
W. Nickel-63	W. Volumetric bulky materials or structural debris	W. 2.0E+06 pCi/g
X. Lead-210	X. Volumetric bulky materials or structural debris	X. 2.3E+05 pCi/g*
Y. Polonium-210	Y. Volumetric bulky materials or structural debris	Y. 2.0E+04 pCi/g
Z. Radium-226	Z. Volumetric bulky materials or structural debris	Z. 2.0E+03 pCi/g*
AA. Radium-228	AA. Volumetric bulky materials or structural debris	AA. 1.8E+03 pCi/g
BB. Radium-228 1 year	BB. Volumetric bulky materials or structural debris	BB. 1.2E+03 pCi/g*
CC. Radium-228 5 years	CC. Volumetric bulky materials or structural debris	CC. 6.7E+02 pCi/g*
DD. Radium-228 10 years	DD. Volumetric bulky materials or structural debris	DD. 5.6E+02 pCi/g*
EE. Ruthenium-106	EE. Volumetric bulky materials or structural debris	EE. 1.9E+04 pCi/g*
FF. Antimony-124	FF. Volumetric bulky materials or structural debris	FF. 7.9E+02 pCi/g



UTAH DIVISION OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEET

License # UT 2300249

6. Radioactive Material (Element and Mass Number)	7. Chemical and/or Physical Form	8. Maximum Concentration In Waste for Disposal
GG. Antimony-125	GG. Volumetric bulky materials or structural debris	GG. 5.3E+03 pCi/g
HH. Tin-113	HH. Volumetric bulky materials or structural debris	HH. 7.3E+05 pCi/g
II. Strontium-90	II. Volumetric bulky materials or structural debris	II. 2.0E+04 pCi/g
JJ. Thorium-230	JJ. Volumetric bulky materials or structural debris	JJ. 1.5E+04 pCi/g
KK. Thorium-232	KK. Volumetric bulky materials or structural debris	KK. 6.8E+02 pCi/g*
LL. Uranium-234	LL. Volumetric bulky materials or structural debris	LL. 3.7E+04 pCi/g
MM. Uranium-235	MM. Volumetric bulky materials or structural debris	MM. 7.7E+02 pCi/g
NN. Uranium-236	NN. Volumetric bulky materials or structural debris	NN. 3.6E+04 pCi/g
OO. Uranium-238	OO. Volumetric bulky materials or structural debris	OO. 2.8E+04 pCi/g
PP. Uranium-natural	PP. Volumetric bulky materials or structural debris	PP. 1.8E+04 pCi/g
QQ. Uranium-depleted	QQ. Volumetric bulky materials or structural debris	QQ. 1.1E+05 pCi/g
RR. Zinc-65	RR. Volumetric bulky materials or structural debris	RR. 1.1E+04 pCi/g

* Daughters are assumed to be present at same concentrations in equilibrium.



UTAH DIVISION OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEET

License # UT 2300249

9. AUTHORIZED USE

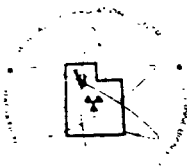
Radioactive material as radioactive waste may be received, stored and disposed of by land burial. The licensee shall not accept low-level radioactive waste generated outside the region comprised of the party states to the Northwest Interstate Compact on Low-Level Radioactive Waste Management ("Compact") namely Alaska, Hawaii, Idaho, Montana, Oregon, Utah and Washington, unless the provisions of Articles IV and V of the Compact are met. Prior to receiving any such shipments, the licensee shall submit to the Utah Division of Radiation Control documentation evidencing compliance with these Compact provisions.

CONDITIONS

10. Licensed material shall be used at the licensee's facility located in Section 32 of Township 1 South and Range 11 West, Tooele County, Utah.
11. The licensee shall not possess at any time, more than 300,000 cubic yards of radioactive waste material which is not disposed of in accordance with the finished design requirements. This includes all wastes in storage or active processing.
12. Pursuant to R447-12-54(1), the licensee is granted as exemption to R447-25-9, as it relates to land ownership and assumption of ownership.
13. The maximum quantity of special nuclear material which the licensee may possess, undisposed of, at any one time shall not exceed 350 grams of U-235.
14. Licensed material specified in Item 6.A through 6.RR shall not be placed in a disposal cell unless it has been determined that the concentration of radionuclides is appropriately homogeneous within the physical form of the waste. This does not pertain to structural debris superficially contaminated with licensed materials.
15. A. If a mixture of radionuclides a, b, and c are present in the waste in the concentrations C_a , C_b , and C_c and if the applicable maximum waste concentrations from Item 8 of this license are MWC_a , MWC_b , and MWC_c respectively, then the concentration in the waste shall be limited so that the following relationship exists.

$$\frac{C_a}{MWC_a} + \frac{C_b}{MWC_b} + \frac{C_c}{MWC_c} \leq 1$$

- B. If a single radionuclide is present in the waste, the concentration shall not exceed the applicable value found in Item 8 of this license.



UTAH DIVISION OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEET

License # UT 2300249

16. A. The licensee may receive for treatment, storage, and disposal any radioactive waste as authorized by this license that contains hazardous constituents as permitted by the "RCRA Hazardous Waste Operations Permit" issued by the Executive Secretary, Utah Solid and Hazardous Waste Committee and "HWSA Permit" issued by the U.S. Environmental Protection Agency.
- B. The licensee shall dispose of these wastes in the "mixed waste" disposal embankment only.
17. Sealed sources as defined in R447-12-3(64) shall not be accepted for disposal.
18. Radioactive waste containing liquid, shall not be accepted for disposal except as provided by the Ground Water Discharge Permit, number UGW 450005, issued by the Executive Secretary of the Utah Water Quality Board.
19. The licensee shall comply with the provisions of Chapter R447-18, "Notices, Instructions and Reports to Workers by Licensees or Registrants, Inspections" and Chapter R447-15, "Standards for Protection Against Radiation".
20. The licensee may transport licensed material or deliver licensed material to a carrier for transport in accordance with the provisions of R447-19-100 "Transportation".
21. Written procedures shall be maintained and available at the disposal facility for operations involving radioactive materials. The procedures shall incorporate operating instructions and appropriate safety precautions for the work. The employee training program shall include detailed review of the operating procedures applicable to the employee's assignments. The requirement for written procedures shall include establishment of procedures for conduct of the radiation safety and environmental monitoring programs, including analytical procedures and instrument calibration requirements. Written procedures and subsequent changes to the procedure shall be reviewed and approved by the Corporate Radiation Safety Officer and the Project Manager. At least annually, all procedures shall be reviewed to assure continued applicability.
22. The Corporation Radiation Safety Officer shall perform and document weekly inspections of the facility and report any findings of non-compliance, affecting radiological safety, to the Project Manager. Items for inspection include: operating procedures, license requirements and safety practices.
23. The licensee shall conduct contamination surveys in accordance with Table 7.2 of the license amendment application dated September 20, 1990.
24. The licensee shall conduct a bioassay and occupational airborne radioactive contamination monitoring program in accordance with Section 7.4.8.3 of the license amendment application dated September 20, 1990.



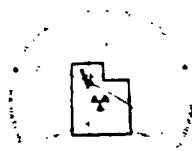
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25. The use of respirators shall be controlled by a respiratory protection program as stipulated in R447-15-103.
26. The licensee shall calibrate air sampling equipment at intervals not to exceed six months.
27. The operational environmental monitoring program shall be conducted in accordance with Section 4.5, Table 4.7 and Figure 4.6 of the license amendment application dated September 20, 1990.
28. Vehicles, facilities, equipment or other items for unrestricted use shall not be released from the licensee's control if contamination measurements exceed the following limits:

Nuclide ^a	Column I Average ^{b,c,f}	Column II Maximum ^{b,d,f}	Column III Removable ^{b,e,f}
U-nat, U-235, U-238, and associated decay products	5,000 dpm alpha/ 100 cm ²	15,000 dpm alpha/ 100 cm ²	1,000 dpm alpha/ 100 cm ²
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm ²	300 dpm/100 cm ²	20 dpm/100 cm ²
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000 dpm/100 cm ²	3,000 dpm/100 cm ²	200 dpm/100 cm ²
Beta-gamma emitters (nuclides with decay modes other than alpha emissions or spontaneous fission) except Sr-90 and other noted above.	5,000 dpm beta, gamma/100 cm ²	15,000 dpm beta- gamma/100 cm ²	1,000 dpm beta- gamma/100 cm ²

- a. Where surface contamination by both alpha- and beta-gamma emitting nuclides exists, the limits established for alpha- and beta-gamma emitting nuclides should apply independently.
- b. As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
- c. Measurements of average contaminant should not be averaged over more than one square meter. For objects of less surface area, the average should be derived for each such object.
- d. The maximum contamination level applies to an area of not more than 100 cm².
- e. The amount of removable radioactive material per 100 cm² of surface area should be determined by wiping the area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.
- f. The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters shall not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.



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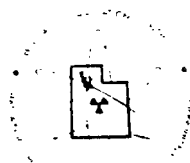
29. A quarterly report shall be prepared by the Corporate Radiation Safety Officer for the Project Manager and Company President evaluating employee exposures, effluent releases and environmental data to determine:
 - A. If there are any upward trends in personnel exposures for identifiable categories of workers or types of operations or in effluent releases;
 - B. If exposures and effluents might be lowered under the concept of maintaining exposures and effluents as low as reasonably achievable; and
 - C. If equipment for exposure and effluent control is being properly used and maintained.
30. In accordance with R447-25-33, the licensee shall submit annual reports to the Division of Radiation Control by the end of the first calendar quarter of each year for the preceding year. The reports shall include:
 - A. Specification of the quantity of each of the principal contaminants released to unrestricted areas in liquid and in airborne effluents during the preceding year.
 - B. The results of the environmental monitoring program;
 - C. A summary of licensee disposal unit survey and maintenance activities; and
 - D. A summary of the volume, radioisotopes and their activities for materials disposed of.
31. Except as provided by this condition, the licensee shall maintain the results of sampling, analyses, surveys, and instrument calibration, reports on inspections and audits, employee training records as well as any related reviews, investigations and corrective actions, for five (5) years. The licensee shall maintain personnel exposure records in accordance with R447-15-401.
32. Operations shall be conducted by or under the supervision of Vernon E. Andrews, Corporate Radiation Safety Officer, or other individuals designated by the Corporate Radiation Safety Officer upon successful completion of the licensee's training program.
33. The licensee shall staff the operations of the facility in accordance with the organization chart (Figure 8.1) of the license amendment application dated September 20, 1990.
34. The licensee staff shall meet the qualifications as described in Section 8.2 and shall have the responsibilities as described in Section 8.1.2 of the license amendment application dated September 20, 1990.



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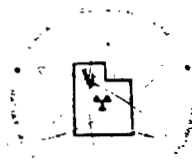
35. The licensee shall not initiate disposal operations in newly excavated areas until the Division of Radiation Control has inspected and approved the cell/embankment liner.
36. The licensee shall provide "as built drawings" of the facility, at intervals not to exceed six (6) months. Drawings shall be submitted by February 1 and August 1 of each year. The drawings shall show conditions on the site as they existed no earlier than thirty (30) days prior to the submittal of the drawings to the Division of Radiation Control. Drawings submitted as, "as built drawings" will be marked as such, and will be marked in the same place on each drawing. Record drawings showing approved future designs, final or finished conditions at the site may be included in the "as built drawings", but shall be marked as "record drawings".
37. Radioactive waste which have been off loaded shall be placed in the appropriate disposal embankment and stored in a manner approved by the Division of Radiation Control.
38. For the purpose of this license, debris is defined as any radioactive waste for disposal other than soils. Compactible debris is defined as: (A) having a gradation that will pass through a four inch (4") grizzly and; (B) as having a density greater than seventy pounds per cubic foot dry weight in accordance with ASHTO T-99. Contaminated materials, other than soil, not meeting these criteria are defined as noncompactible debris.
39. The licensee shall place bulk radioactive materials in twelve inch (12") uncompacted lifts.
40. In-place bulk radioactive waste shall be compacted at a moisture content of zero percent (0%) to three percent (3%) of optimum as determined by the Standard Proctor Method ASTM D-698.
41. The licensee shall compact each lift to not less than ninety percent (90%) of optimum density as determined by Standard Proctor Method ASTM D-698. Sampling points for compaction testing shall include locations immediately adjacent to debris when debris is included in the lift.
42. All debris shall be less than ten inches (10") in at least one (1) dimension, and no longer than eight feet (8') in any dimension.
43. The final 24 inches of the radioactive waste material embankment, within the side slopes and the top surface, shall be free of debris.
44. A lift or any portion of a lift shall be limited to less than ten percent (10%) by volume of noncompactible debris and the debris shall be uniformly distributed throughout the lift. However, noncompactible debris in the form of concrete, stone or solid metal may be placed in the lift up to twenty-five percent (25%) by volume, of the total lift if uniformly distributed throughout the lift.



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45. The licensee shall excavate the disposal cell liner, consisting of native materials, to a depth of twenty-four inches (24") and replace it with imported clay in six inch (6") uncompacted lifts. Each lift shall be compacted to not less than ninety-five percent (95%) optimum density as determined by ASTM D-698 and field permeability of 1.0×10^{-7} cm/sec.
46. The licensee shall not place, compactible nor non-compactible debris, in the first lift.
47. The disposal cell liner and radon barrier shall be constructed with a moisture content of zero percent (0%) to three percent (3%) of optimum moisture as determined by Standard Proctor Method ASTM D-698.
48. The licensee shall compact the radon barrier to not less than 95 percent of optimum density as determined by Standard Proctor Method ASTM D-698 and a field permeability of 1.0×10^{-7} cm/sec.
49. The licensee shall record, at the time of acceptance, the date and time of day that any lift or portion of a lift has been accepted by the licensee as finished in accordance with all specifications and license conditions.
50. The licensee shall use rock filter zone and rock erosion barrier that has been sized and graded in accordance with Section 3.1.1.2 and 9.2.5 of the license amendment application dated September 20, 1990.
51. The licensee shall test rock erosion barrier and filter zone rock in accordance with the provisions found in Section 9 of the license amendment application dated September 20, 1990.
52. The licensee shall utilize a manifest ("Radioactive Waste Shipment and Disposal Record," Envirocare Form E-100) containing the information required in R447-15-311(2) and (3) including:
 - A. Specification of any solidification agents utilized;
 - B. Identification of wastes containing more than 0.1% by weight of chelating agents. Chelating agents means amine polycarboxylic acids, hydroxyl-carboxylic acids, gluconic acids and polycarboxylic acids;
 - C. An estimate of the weight percentage of any chelating agents in waste.
53. The licensee shall not accept radioactive waste for storage and disposal unless the licensee has received a complete "Radioactive Waste Shipment and Disposal Record" (Form #E-100) from the shipper.
54. The licensee shall maintain copies of complete manifests or equivalent documentation until the Division of Radiation Control authorizes their disposition.



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55. The licensee shall immediately notify the Division of Radiation Control or the Division's on-site representative of any waste shipment where a violation of applicable regulations or license conditions has been found.
56. The licensee shall require anyone who transfers radioactive waste to the facility comply with the requirements in R447-15-311(4)(a) through (h).
57. The licensee shall acknowledge receipt of the waste within one (1) week of receipt by returning a signed copy of the manifest or equivalent documentation to the shipper. The shipper to be notified is the licensee who last possessed the waste and transferred the waste to the licensee. The returned copy of the manifest or equivalent documentation shall indicate any discrepancies between materials listed on the manifest and materials received.
58. The licensee shall notify the shipper (i.e., the generator, the collector, or processor) and the Division of Radiation Control when any shipment or part of a shipment has not arrived within 60 days after the advance manifest was received.
59. The licensee shall maintain a record for each shipment of waste disposed of at the site. As a minimum, the record shall include:
 - A. The date of disposal of the waste;
 - B. The location of waste in the disposal site;
 - C. The condition of the waste packages received;
 - D. Any discrepancy between the waste listed on the shipment manifest or shipping papers and the waste received in the shipment.
 - E. A description of any evidence of leaking or damaged packages or radiation or contamination in excess of applicable regulatory limits; and
 - D. A description of any repackaging operations of any of the waste packages in the shipment.
60. In accordance with R447-25-31 the licensee shall maintain a Utah Division of Radiation Control Surety (Trust) Agreement adequate to fund the decommissioning and reclamation of the grounds, equipment and facilities. These costs, identified in Section 10 of the license amendment application dated September 20, 1990, shall be reviewed and updated annually and a report submitted to the Utah Division of Radiation Control within 60 days after July 1, of each year. The survey arrangement shall be updated as necessary to reflect decommissioning and reclamation costs.



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61. Truck, railcar, waste hauling and other earth moving equipment washdown (decontamination) facilities, including evaporation ponds, shall be controlled and fenced to prevent intrusion.
62. All burial embankments and waste storage areas, including immediately adjacent drainage structures, shall be controlled areas, surrounded by a six foot (6') high, chain link fence, topped with twisted selvedge. All permanent fence shall be chain link, six feet (6') high, topped with three strand barbed wire, top tension wire and twisted selvedge.
63. The licensee shall fulfill and maintain compliance with all conditions and shall meet all compliance schedules stipulated in the Ground Water Discharge Permit, number UGW 450005, issued by the Executive Secretary of the Utah Water Quality Board.
64. One (1) year prior to the anticipated closure of the site, the licensee shall submit a final version of the site closure, decontamination and decommissioning plan. As part of this plan, the licensee shall demonstrate by measurements and/or modeling that concentrations of radioactive materials which may be released to the general environment, after site closure, will not result in an annual dose exceeding 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public.
65. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive material described in Item 6, 7, and 8 of this license and conduct site operations in accordance with statements, representations, operating procedures, and disposal criteria, heretofore made by the licensee or his authorized representative in application for and subsequent to issuance of Utah Radioactive Material License No. UT 2300249 and amendments thereto.

March 16, 1992
Date

Larry F. Anderson
Larry F. Anderson, Executive Secretary, Utah Radiation Control Board



Exhibit F3

RCRA PERMIT FOR ENVIROCARE



STATE OF UTAH PLAN APPROVAL

Permittee:

Envirocare of Utah, Inc.

Tooele County, Utah

EPA Identification Number UTD982598898

Pursuant to the Utah Solid and Hazardous Waste Act, (the Act), 26-14-1, et. seq., Utah Code Annotated 1953, as amended and the Utah Administrative Code (UAC) (R450-1 through R450-13 and R450-50) as adopted by the Utah Solid and Hazardous Waste Committee, (the Committee), a plan approval (herein after called "permit") is issued to Envirocare of Utah, Inc. (hereafter called the "Permittee"), to operate a hazardous waste treatment and storage facility in Tooele County, Utah, at latitude 40° 41' 00" North and longitude 113° 06' 03" West. The U.S. Environmental Protection Agency (U.S. EPA) has authorized the Executive Secretary to issue such a permit under Section 3006(b) of the Resource Conservation and Recovery Act (RCRA).

The Permittee must comply with all the terms and conditions of this permit. The permit consists of the conditions contained herein (including the portions of the application attached and incorporated by reference), and the applicable portions of R450-1 through R450-13, R450-50, and R450-101 contained in the permit. Applicable rules are those which are in effect on the date of issuance of this permit.

This permit is based on the premise that the information submitted in the application dated July 22, 1987 as modified by subsequent amendments dated April 25, 1988 and July 25, 1989 (hereafter referred to as the application), is accurate and that the facility will be operated as specified in the referenced portions of the application, except as modified by the conditions herein. Portions of the application are attached and incorporated herein by reference, wherever noted, as part of this permit. Any inaccuracies or misrepresentations found in the application may be grounds for the termination or modification of this permit (see R450-3-9.). The Permittee must inform the Executive Secretary of any deviation from, or changes in the information in the application which would affect the Permittee's ability to comply with the applicable regulations or permit conditions.



This permit is effective as of November 30, 1990 and shall remain in effect until November 30, 2000, unless revoked and reissued (R450-3-9.1(a)(b)(c)) or terminated (R450-3-9.2.), or continued in accordance with R450-3-5(d).

Signature: _____

Dennis R. Downs

Date: _____

11/30/90

Dennis R. Downs
Executive Secretary
Utah Solid and Hazardous Wastes Committee



NOTE TO ENVIROCARE'S PART B PERMIT CERTIFICATE:

The Envirocare site is licensed by the Utah Bureau of Radiation Control for disposal of radioactive waste. The site is also licensed by the Utah Bureau of Radiation Control and permitted by the Utah Bureau of Solid and Hazardous Waste for disposal of "mixed" (hazardous/radioactive) waste.

Any one wishing to visit the site should contact the Permittee to make arrangements for a site tour and to determine that all safety requirements are met prior to entering the site.

Inspectors who will have extensive contact with the site should contact both the Utah Bureau of Radiation Control and the Utah Bureau of Solid and Hazardous Waste to determine that all safety requirements i.e. safety equipment, safety training, and/or physical, are met prior to entering the site.

Exhibit F4

HAZARDOUS WASTES ACCEPTABLE FOR DISPOSAL AT ENVIROCARE

**APPROVED HAZARDOUS WASTE NUMBERS
ENVIROCARE OF UTAH, INC.**

**APPROVED HAZARDOUS WASTE NUMBERS
ENVIROCARE OF UTAH, INC.**

RCRA Wastes

EPA Waste No.		Hazard Code
D001	Ignitability	(I)
D002	Corrosivity	(C)
D003	Reactivity	(R)
D004	Arsenic	(E)
D005	Barium	(E)
D006	Cadmium	(E)
D007	Chromium	(E)
D008	Lead	(E)
D009	Mercury	(E)
D010	Selenium	(E)
D011	Silver	(E)
D012	Endrin	(E)
	(1,2,3,4,10,10-hexachloro-1,7,epoxy-1,4,4a,5,6,7,8,8a-0 octahydro-1,4, endo, endo-5,8-dimeth-ano-naphthalene)	
D013	Lindane	(E)
	(1,2,3,4,5,6, hexa-chloro-cyclohexane, gamma isomer)	
D014	Methoxychlor	(E)
	(1,1,1-Trichloro-2,2-bis[p-methoxyphenyl]ethane)	
D015	Toxaphene	(E)
	(C ₁₀ H ₁₀ Cl ₈ , technical chlorinated camphene, 67-69 percent chlorine)	
D016	2,4-D	(E)
	(2,4 dichlorophenoxyacetic acid)	
D017	2,4,5-TP Silvex	(E)
	(2,4,5-trichloro-phenoxypropionic acid)	
D018	Benzene	(I)
D019	Carbon Tetrachloride	(C)
D020	Chlordane	(R)
D021	Chlorobenzene	(E)
D022	Chloroform	(E)
D023	o-Cresol	(E)
D024	m-Cresol	(E)
D025	p-Cresol	(E)
D026	Cresol	(E)
D027	1,4-Dichlorobenzene	(E)
D028	1,2-Dichloroethane	(E)
D029	1,1-Dichloroethylene	(E)
D030	2,4-Dinitrotoluene	(R)
D031	Heptachlor (and its epoxide)	(E)
D032	Hexachlorobenzene	(E)
D033	Hexachlorobutadiene	(E)
D034	Hexachloroethane	(E)
D035	Methyl Ethyl Ketone	(E)
D036	Nitrobenzene	(E)
D037	Pentachlorophenol	(E)
D038	Pyridine	(E)
D039	Tetrachloroethylene	(E)
D040	Trichloroethylene	(R)
D041	2,4,5-Trichlorophenol	(E)
D042	2,4,6-Trichlorophenol	(E)
D043	Vinyl Chloride	(E)

**APPROVED HAZARDOUS WASTE NUMBERS
ENVIROCARE OF UTAH, INC.
(continued)**

HAZARDOUS WASTE FROM NON-SPECIFIC SOURCES:

F001 The following spent halogenated solvents used in degreasing:

Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004 and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

F002 The following spent halogenated solvents:

Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane; and all spent solvent mixtures/ blends containing, before use, a total of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

F003 The following spent non-halogenated solvents:

Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and, a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

F004 The following spent non-halogenated solvents:

Cresols and cresylic acid, nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

F005 The following spent non-halogenated solvents:

Toluene, methyl ethyl ketone, carbon disulfide, isobutanol, and pyridine; benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

**APPROVED HAZARDOUS WASTE NUMBERS
ENVIROCARE OF UTAH, INC.
(continued)**

HAZARDOUS WASTE FROM NON-SPECIFIC SOURCES (continued):

- F006 Waste-water treatment sludges from electroplating operations except from the following processed: (1) Sulfuric acid anodizing for aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.
- F007 Spent cyanide plating bath solutions from electroplating operations.
- F008 Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.
- F009 Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.
- F010 Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.
- F011 Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.
- F012 Quenching waste water treatment sludges from metal heat treating operations where cyanides are used in the process.
- F019 Waste-water treatment sludges from the chemical conversion coating of aluminum.
- F028 Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Nos. F020, F021, F022, F023, F026 and F027.

HAZARDOUS WASTE FROM SPECIFIC SOURCES:

- K011 Bottom stream from the wastewater stripper in the production of acrylonitrile.
- K013 Bottom stream from the acetonitrile column in the production of acrylonitrile.
- K050 Heat Exchanger Bundle Cleaning Sludge from the petroleum refining industry.
- K051 API separator sludge from the petroleum refining industry.
- K052 Tank bottoms (leaded) from the petroleum refining industry.

APPROVED HAZARDOUS WASTE NUMBERS
ENVIROCARE OF UTAH, INC.
(continued)

HAZARDOUS WASTE FROM SPECIFIC SOURCES (continued):

K061 Emission control dust/sludge from the primary production of steel in electric furnaces.

K069 Emission control dust/sludge from the secondary lead smelting.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUES, AND SPILL RESIDUES THEREOF:

P003	Acrolein	H
P004	Aldrin	H
P010	Arsenic Acid	H
P011	Arsenic Pentoxide	H
P012	Arsenic Trioxide	H
P013	Barium Cyanide	H
P015	Beryllium Dust	H
P021	Calcium Cyanide	H
P022	Carbon Disulfide	H
P024	p-Chloroaniline	H
P027	3-Chloropropionitrile	H
P029	Copper Cyanide	H
P030	Cyanides (soluble cyanide salts), n.o.s.	H
P037	Dieldrin	H
P046	alpha, alpha-Dimethylphenethylamine	H
P047	4,6-Dinitro-2-Methylphenol	H
P048	2,4-Dinitrophenol	H
P050	Endosulfan	H
P051	Endrin	H
P056	Fluorene	H
P059	Heptachlor	H
P060	Isodrin	H
P074	Nickel Cyanide	H
P077	p-Nitroaniline	H
P082	N-Nitrosodimethylamine	H
P098	Potassium Cyanide	H
P099	Potassium Silver Cyanide	H
P104	Silver Cyanide	H
P106	Sodium Cyanide	H
P107	Strontium Sulfide	H
P113	Thallium (III) Oxide	H
P114	Thallium Selenite	H
P115	Thallium (I) Sulphate	H
P119	Ammonium Vanadate	H
P120	Vanadium (V) Oxide	H
P121	Zinc Cyanide	H
P122	Zinc Phosphide (>10%)	H
P123	Toxaphene	H

APPROVED HAZARDOUS WASTE NUMBERS
ENVIROCARE OF UTAH, INC.
(continued)

COMMERCIAL CHEMICAL PRODUCTS, MANUFACTURING CHEMICAL
INTERMEDIATES, OR OFF-SPECIFICATION COMMERCIAL CHEMICAL
PRODUCTS:

U002	Acetone	I
U004	Acetophenone	T
U007	Acrylamide	T
U009	Acrylonitrile	T
U012	Aniline	I, T
U018	Benzo(a)anthracene	T
U019	Benzene	T
U021	Benzidine	T
U022	Benzo(a)pyrene	T
U027	Bis(2-chloroisopropyl)ether	T
U028	Bis(2-Ethylhexyl) Phthalate	T
U029	Bromomethane	T
U030	4-Bromophenyl Phenyl Ether	T
U031	n-Butyl Alcohol	I
U032	Calcium Chromate	T
U036	Chlordane	T
U037	Chlorobenzene	T
U039	4-Chloro-3-methyl Phenol	T
U042	2-Chloroethylvinyl Ether	T
U043	Vinyl Chloride	T
U044	Chloroform	T
U045	Chloromethane	T
U047	2-Chloronaphthalene	T
U048	2-Chlorophenol	T
U050	Chrysene	T
U052	Cresols/Cresylic Acid	T
U056	Cyclohexane	I
U057	Cyclohexanone	I
U060	DDD	T
U061	DDT	T
U062	Diallate	T
U063	Dibenz(a,h)anthracene	T
U066	1,2-Dibromo-3-Chloropropane	T
U067	1,2-Dibromoethane	T
U068	Dibromomethane	T
U069	Di-n-Butylphthalate	T
U070	o-Dichlorobenzene	T
U071	m-Dichlorobenzene	T
U072	p-Dichlorobenzene	T
U073	3-3'-Dichlorobenzidine	T
U074	1,4-Dichloro-2-Butene	I, T
U075	Dichlorodifluoroethane	T
U076	1,1-Dichloroethane	T
U077	1,2-Dichloroethane	T
U078	1,1-Dichloroethylene	T
U079	1,2-Dichloroethylene	T
U080	Methylene Chloride	T
U081	2,4-Dichlorophenol	T
U082	2,6-Dichlorophenol	T
U083	1,2-Dichloropropane	T
U084	1,3-Dichloropropene	T
U088	Diethylphthalate	T
U093	Dimethylaminoazobenzene	T

APPROVED HAZARDOUS WASTE NUMBERS
ENVIROCARE OF UTAH, INC.
(continued)

COMMERCIAL CHEMICAL PRODUCTS, MANUFACTURING CHEMICAL
INTERMEDIATES, OR OFF-SPECIFICATION COMMERCIAL CHEMICAL PRODUCTS
(continued):

U094	7,12-Dimethylbenz(a)anthracene	T
U095	3,3'-Dimethylbenzidine	T
U101	2,4-Dimethylphenol	T
U102	Dimethylphthalate	T
U105	2,4-Dinitrotoluene	T
U106	2,6-Dinitrotoluene	T
U107	Di-n-Octyl Phthalate	T
U109	1,2-Diphenylhydrazine	T
U112	Ethyl Acetate	I
U117	Ethyl Ether	I
U119	Ethyl Methanesulfonate	T
U120	Fluoranthene	T
U121	Trichlorofluoromethane	T
U127	Hexachlorobenzene	T
U128	Hexachlorobutadiene	T
U129	Lindane (Hexachlorocyclohexane)	T
U130	Hexachlorocyclopentadiene	T
U131	Hexachloroethane	T
U132	Hexachlorophene	T
U135	Hydrogen Sulfide	T
U137	Indeno(1,2,3-cd)pyrene	T
U138	Iodomethane	T
U140	Isobutyl Alcohol	I,T
U142	Kepone	T
U144	Lead Acetate	T
U145	Lead Phosphate	T
U146	Lead Subacetate	T
U151	Mercury	T
U154	Methanol	I
U157	3-Methylcholanthrene	T
U158	4,4'-Methylene Bis(2-Chloroaniline)	T
U159	Methyl Ethyl Ketone	I,T
U161	Methyl Isobutyl Ketone	I
U165	Naphthalene	T
U167	1-Naphthalenamine	T
U168	2-Naphthalenamine	T
U169	Nitrobenzene	I,T
U170	4-Nitrophenol	T
U171	2-Nitropropane	I,T
U172	N-Nitroso-di-n-butylamine	T
U179	N-Nitrosopiperidine	T
U182	Paraldehyde	T
U183	Pentachlorobenzene	T
U184	Pentachloroethane	T
U185	Pentachloronitrobenzene	T
U187	Phenacetin	T
U188	Phenol	T
U191	2-Picoline	T
U192	Pronamide	T
U196	Pyridine	T
U204	Selenium Dioxide	T
U205	Selenium Sulfide	T
U207	1,2,4,5-Tetrachlorobenzene	T

APPROVED HAZARDOUS WASTE NUMBERS
ENVIROCARE OF UTAH, INC.
(continued)

COMMERCIAL CHEMICAL PRODUCTS, MANUFACTURING CHEMICAL
INTERMEDIATES, OR OFF-SPECIFICATION COMMERCIAL CHEMICAL PRODUCTS
(continued):

U208	1,1,1,2-Tetrachloroethane	T
U209	1,1,2,2-Tetrachloroethane	T
U210	Tetrachloroethylene	T
U211	Carbon Tetrachloride	T
U212	2,3,4,6-Tetrachlorophenol	T
U214	Thallium (I) Acetate	T
U215	Thallium (II) Carbonate	T
U216	Thallium (I) Chloride	T
U217	Thallium (I) Nitrate	T
U220	Toluene	T
U225	Bromoform	T
U226	1,1,1-Trichloroethane	T
U227	2-Ethoxyethanol	T
U228	Trichloroethylene	T
U230	2,4,5-Trichlorophenol	T
U231	2,4,6-Trichlorophenol	T
U232	2,4,5-TP	T
U233	2,4,5-TP Silvex	T
U235	Tris(2,3-Dibromopropyl) Phosphate	T
U237	Uracil Mustard	T
U239	Xylene	I
U240	2,4-Dichlorophenoxyacetic acid	T
U242	Pentachlorophenol	T
U243	Hexachloropropene	T
U247	Methoxychlor	T
U249	Zinc Phosphide (<10%)	T
U359	1,1,2-Trichloroethane	T

Other Wastes

- o Chemical Waste from the Envirocare Laboratory: Laboratory waste which can be landfilled on site will be disposed of at Envirocare. Other wastes will be sent off-site for hazardous waste management.
- o On-site Generated Waste: Wastes generated at the facility can generally be characterized adequately as to the composition of the waste.

(Note: Non-radioactive hazardous wastes must not be mixed with radioactive wastes to avoid or circumvent the land disposal restrictions.)

Exhibit G

ACCEPTANCE LIMITS AND CRITERIA FOR CONTAMINATED OILS AT SEG

WASTE ACCEPTANCE POLICY

PURPOSE: The purpose of this policy is to provide a uniform plan and procedure for the acceptance of low level radioactive waste for processing.

POLICY: SEG will accept waste which meets our waste acceptance criteria, can be safely processed, and meets the SEG license criteria. Waste which does not meet the general acceptance criteria may be accepted after evaluation and approval of the pertinent waste information provided on a Non-standard Waste Acceptance Form (NWAFF).

ACCEPTANCE OF NORMAL WASTE:

Normal waste is defined as any radioactive waste which meets the waste acceptance criteria listed below:

1. Low Level Waste Acceptance Criteria
2. Oil Acceptance Criteria
3. Metal Acceptance Criteria
4. TRU (Transuranic) Criteria
5. Liquid Waste/Bldg 3 Criteria (to be added later)

Waste which meets these criteria will be accepted if SEG has sufficient "financially assured storage space", if its licensed radionuclide inventory will not be exceeded, and can be processed within the allowed license time frame. Other business and/or process related factors may cause otherwise acceptable waste to be refused or delayed.

RESPONSIBILITIES:

REGULATORY SERVICES: Shall be responsible for the following:

1. Assist in determining that the material would meet DOT and burial site criteria.
2. Accepting the advanced waste shipment notification and assuring that the proposed shipment complies with the SEG Waste Acceptance Criteria.
3. Determining that the proposed shipment can be stored on "financially assured storage space".
4. Determining that the proposed shipment will not cause SEG to exceed its licensed radionuclide concentrations on any license.

BEAR CREEK AND GALLAHER OPERATIONS DEPARTMENT: Shall be responsible for the following:

1. Providing the Regulatory Service Department with regular information regarding the storage space available.
2. Determining that the proposed shipment will not cause any fence-line dose to be exceeded when stored awaiting processing.
3. Determining how the waste can be safely processed.
4. If the waste is approved using the NWAFF form, the operations department will provide information to the sales department regarding the method of processing, the estimated manpower, and the equipment required to process the waste. In addition, a processing schedule shall be provided.

DATA SYSTEMS: Shall be responsible for the following:

1. Providing a weekly radionuclide inventory and/or updates to the inventory when requested.

ACCEPTANCE OF NON-STANDARD WASTE:

SEG may accept waste which does not meet our standard waste acceptance criteria using the following procedure:

SALES DEPARTMENT: The customer service department shall work with the customer to determine and document the following information on the Non-Standard Waste Acceptance Form (NWAFF):

1. Generator's company name & facility
2. Contact name and phone number
3. Waste description
4. Radionuclide and activity information
5. Size, weight and volume data
6. Biological activity
7. Special characteristics
8. Desired date of shipment
9. Method of shipment

10. Planned packaging
11. Special disposal instructions
12. Amount of free-standing water
13. Material requiring quick processing

NOTE: Operations to generate cost figures for additional processes required. This cost figure shall be on a separate page.

After completing the NWAFF and depending on the waste type, the Customer Service Department shall work with the appropriate manager to determine the acceptability of the waste form. The appropriate manager shall indicate his agreement in writing on the NWAFF. He should consider the following:

1. Can the waste be processed in a time period which meets our license condition,
2. Can the waste be safely processed in the planned manner,

Pricing for Non-Standard waste shall be developed by the Marketing Manager with the assistance of the appropriate manager.

When the appropriate Processing Manager approves the waste for processing, then the Customer Service Department shall obtain the written approval of the Manager of Regulatory Services, or his designee, concerning the acceptability of the waste meeting our license and permit requirements. Factors to be considered by the Manager of Regulatory Services will include:

1. Can the waste be safely shipped, received, and effectively processed for burial,
2. Can the radionuclide concentrations be accepted without exceeding our license permit limitations,
3. Can the waste be processed in a manner which meets our ALARA and safety plan objectives,

After the NWAF has been completed and the appropriate signatures have been obtained, a copy of the NWAF shall be provided to the following:

1. Cognizant Production Manager
2. Regulatory Services Department
3. Incoming Shipment Coordinator
4. Customer Service Department
5. Invoicing Department
6. Fax copy of completed form to the client and document to the files.

LOW LEVEL WASTE ACCEPTANCE CRITERIA
ATTACHMENT 2
THE SCIENTIFIC ECOLOGY GROUP, INC.

SOLID/NON-METAL
RADIOACTIVE WASTE DESCRIPTION

The Scientific Ecology Group, Inc. (SEG) defines Radioactive Waste as radioactive materials and their containers described, identified, marked, and labeled in compliance with applicable Federal, State and local regulations which meet the ACCEPTANCE CRITERIA listed below. The waste consists of any solid material meeting these ACCEPTANCE CRITERIA.

ACCEPTANCE CRITERIA

The following are general criteria for waste acceptance at SEG. Different criteria are available depending on Client needs.

*Radiation Level per Package - <200 mR/hr at contact (1 cm).

*DAW waste with radiation levels higher than 200 mR/hr should be packaged in 55 gallon drums or SEG supplied innerpack boxes. This waste category requires SEG approval prior to shipment.

Removable External Contamination - <2200 dpm beta-gamma/100 sq cm.
<220 dpm alpha/100 sq cm.

Radionuclide Content per Package:*

Mixed F&AP (Z<84)	- <25 mCi/cf
Ra-226	- <0.1 mCi/cf and <10 nCi/gm
Th-232	- <5 mCi/cf (100 lb Th/cf waste)
U-238 as metal or oxide	- <15 mCi/cf (100 lb U/cf waste)
U-233, U-235	- <0.1 gm/cf
Transuranics	- <10 nCi/gm

*Acceptance criteria for incineration may be more restrictive for certain radionuclides; primarily, H-3, C-14, Tc-99, I-129, Sr90. Other radionuclides may also be affected based on incinerator permit limits. Your SEG representative will be happy to assist you if you have any other questions.

Client is required to pre-notify (by telephone or fax) SEG to approve shipment prior to transport. Generator must maintain an active disposal site permit.

Package Volume Determination:

55-Gallon Drums - 7.5 cf

Other Containers - Based on External Dimensions

Physical and Chemical Composition - No gases, biological materials, chelating agents, hazardous chemicals, pyrophorics, nor explosives. Solid wastes must not contain any significant free standing liquids. SEG will only accept waste materials which are acceptable at the destination burial ground.

Contact SEG for special materials which require processing for them to become acceptable at the destination burial ground.

FILTERS - Activity less than 0.1 uCi/cc of those isotopes with half-life greater than five years. Please call an SEG representative for activity levels greater than 0.1 uCi/cc.

ASBESTOS WASTE - All asbestos will be properly manifested, identifying number of bags, boxes, etc. Containers are to be properly identified (Labeled) on the primary containers as well as the secondary or individual containers. SEG does not have an abatement program, therefore, material should be sized and packaged to allow repackaging for compaction without breaching the primary container (i.e.. double plastic wrapping).

CONDENSER TUBES - Tubes to be relatively straight (some curvature is permissible) and the tubes are not to be pinched closed or grooved during removal. Interior buildup of scale to be less than 2% of the total weight of the tube. Condenser tubes to be removed in such a manner that will not grind contamination into the tube; that will segregate the stainless steel tubes from the brass tubing; that the inside of the tubes are dry or will be drained prior to loading. In addition, if any beveled ends exist, the beveled ends to be loaded toward the front of the container.

11/92

SEG ACCEPTANCE LIMITS FOR CONTAMINATED OILS

NOTE: This is a general guideline used for interfacing analytical results in client's oil with SEG's acceptance criteria for oil. SEG's acceptance criteria is based upon EPA regulations contained in 40 CFR 261/266, Tennessee Valley Authority requirements and the State of Tennessee regulations, where appropriate.

TYPE OF ANALYSIS

SEG ACCEPTANCE CRITERIA

1. Toxicity Characteristic (TCLP)

Heavy Metals (40 CFR 261.24)

Arsenic	< 5.00 mg/l
Barium	< 100.00 mg/l
Cadmium	< 1.00 mg/l
Chromium	< 5.00 mg/l
Lead	< 5.00 mg/l
Mercury	< 0.2 mg/l
Selenium	< 1.00 mg/l
Silver	< 5.00 mg/l

Organics

See list of 31 organic compounds and their respective regulatory levels listed under 40 CFR 261.24. Any compound which cannot be certified by the generator to be absent from the oil must be tested for under TCLP standards.

- | | |
|-------------------------|-------------------|
| 2. Total Halogens (TOX) | Equal to or less |
| | than 1000 ppm - |
| (ASTM Method D808-81) | Unless rebutted * |

- * EPA has specified 1000 ppm total halogens as the level at which they presume mixing with spent halogenated solvents has occurred. The oil can contain up to 4000 ppm total halogens if the presumption of mixing can be successfully rebutted. To successfully rebut the mixing presumption, you must be able to show that the oil contains less than 100 ppm of any individual halogenated solvent listed as an F001 or F002 waste and certify that there has been no additional mixing of hazardous constituents with the oil. Additional volatile organic analysis (EPA method 8240) would be required to analyze for these individual halogenated compounds.

3. Polychlorinated Biphenyls < 2.00 ppm

Limits based upon request by the Tennessee Valley Authority and EPA regulations contained in 40 CFR 761.

4. Flashpoint Equal to or greater than 140°F

5. Viscosity Less than 3000 ssu

6. Solids Content Less than 10% by volume

7. Aqueous Liquid Content Less than 10% by volume

8. Radiological Analyses:

A. Maximum total concentration of radionuclides less than 1E-4 (uCi/ml) averaged over truckload lot.

B. Uranium at less than 1E-5 (uCi/ml) averaged over truckload lot.

C. No other alpha emitters comprising >10% of the total amount in a single container (prior arrangements/rad. license).

9. Maximum Individual Isotope Activities

A. H-3 1.9 microci/gallon or 0.5 nanoci/ml

B. C-14 0.1 microci/gallon or 0.026 nanoci/ml

C. Tc-99 0.4 microci/gallon or 0.1 nanoci/ml

D. I-129 0.01 microci/gallon or 0.0026 nanoci/ml

NOTE: Oil which exceeds any of the above radiological limits will require prior approval by SEG. SEG will review these requests on a case-by-case basis.

ATTACHMENT 2
TO SEG'S RADIOACTIVE WASTE SERVICES AGREEMENT
BURNING OF RADIOACTIVE OILS

PART 2. 1 SEG RADIOACTIVELY CONTAMINATED OIL ACCEPTANCE CRITERIA

SEG standard oil pricing is based upon oil acceptable for burning with the following specifications:

1. Oil with grades less than 40 weight.
2. Specific oil history should be identified if possible.
3. Solids content less than 10% by volume.
4. Aqueous liquid content less than 10% by volume.
5. Certified to be free of listed and characteristic hazardous waste as defined by RCRA or the Toxic Substances Control Act (TSCA). Oil which contains detectable levels of PCB's (2 ppm or greater) as regulated by the Toxic Substance Control Act (TSCA) would not be acceptable by SEG.
6. Shipped in leak-tight containers.
7. Maximum Radionuclide concentration less than 1×10^{-4} uCi/ml with Uranium at $< 1 \times 10^{-5}$ uCi/ml both averaged over a truckload lot and with no other significant alpha emitters comprising >10% of the total amount of any single container may be taken, but prior notification and approval is required.

Normal oils and heating oils, including kerosene, hydraulic oil, diesel, and other flammable oils are acceptable if they are not listed hazardous wastes or characteristic wastes. Alcohol or gasolines or highly flammable solvents that comprise <1% of total are acceptable. Call a SEG representative for pricing on alcohols, gasolines, and highly flammable solvents that exceed 1%. If you have questions about your specific oil mixture, contact your SEG representative for a determination.

SEG can also analyze your oils and provide you with necessary certification for suspect oils. Analytical costs vary, depending upon extent and nature of the analysis. Contact an SEG representative for details. SEG will work with you to determine what is required to qualify your oil for disposal. Radioactive or commingled oils which cannot be burned will be solidified and buried according to the regulations at the time. In addition, a waste burial allocation will be required for any nuclear power plant oil or sludge which cannot be burned and must be solidified and buried.

Surcharges over and above the price for burning oils may be applied for higher solid content or nonflammable liquids, or any oils that may require solidification for burial or oils that require certification to allow burial. SEG will perform additional tasks on a time and material basis with labor charged at 3.0 times direct salary and other costs billed at cost plus 20%.

ATTACHMENT 2
SEG'S RADIOACTIVE WASTE SERVICES AGREEMENT
BURNING OF RADIOACTIVE OILS

PART 2.2 DISCUSSION OF SEG OIL ACCEPTANCE CRITERIA

1. **OIL VISCOSITY:** The viscosity of the oil is important since we are planning to burn the oil in a specific burner. SEG's original guidance on oil viscosity was to specify a grade of 40 or less. A second way of looking at our acceptance criteria is that SEG will accept oil that has a viscosity of 3000 ssu units or less. Alternately, we will accept oil which has a viscosity of 3000 ssu units or less when the oil is diluted with kerosene in a ratio of 1 part kerosene to 2 parts oil. As you can see from this discussion, SEG accepts oil with a wide range of viscosities. If the oil will flow when poured, SEG will probably be able to prepare it for burning. When you have a question on your oil's grade or viscosity, send a sample to SEG for analysis and acceptance. SEG will also take grease if it can be dissolved with kerosene to meet our viscosity requirements. In the case of grease, the charge will be made on the basis of the diluted volume.

2. **ANALYSIS SERVICE:** At the request of the customer, SEG will perform necessary analyses of the oil to determine that it meets our license criteria. The client can ship oil samples to SEG and SEG will analyze the oil for a fee as determined by SEG's Radioactive Waste Services Agreement (Attachment 3 - Burning Radioactive Contaminated Oil.). Results of sampling will be provided to the customer. The analyses that may be required will depend on the history of the oil. Some of the typical tests that might be used and the approximate prices associated with those tests (without markup) are attached. Reference Attachment 3 for SEG's fee for pass through services.

3. **OIL SHIPPING CONTAINERS:** SEG will provide "double containment with absorbent" shipping boxes to the customer. These containers are generally of two types. The first type is an approximate 4'x4'x6' LSA container loaded with internal 79 gallon drum overpacks. The client's 55-gallon drums can then be contained inside of the 79 gallon drums. Absorbent is added around outer 79-gallon drums. The second type container supplied by SEG is more appropriate for those customers that wish to ship oil to SEG in bulk. This container is a double containment sea-land container with absorbent, a sea land container with a full drip pan inside of the container for possible spill. The approximate oil carrying capacity of the box is 210 gallons (4 each 55-gallon drums) and of the sea land is 2500 gallons. Transportation of the containers from SEG to the customer and return will be done at the rates quoted in the fee schedule (see Attachment 3).

4. **SOLIDIFICATION SERVICES:** Oil which contains unacceptable contents for burning will be returned to the customer or at the customers option, be solidified by SEG. Oil which must be solidified will be processed for an extra charge in accordance with Attachment 3. This charge should be less than twice the charge of SEG's standard oil burning fee schedule rate, plus the cost of any sampling and laboratory analysis costs and transportation charges to disposal. SEG will solidify the oil using approved procedures for the selected burial grounds, package the solidified oil, arrange for transportation, and pay for burial. The customer will provide a waste allocation and a burial permit for the selected burial ground.
5. **WASTE EXPORT PERMIT:** SEG will take the lead and arrange for a permit to export solidified oil from the Southeast Compact Region with the assistance of the customer required.
6. **TITLE AND POSSESSION OF WASTE:** SEG will take title and possession of the oil when it is delivered at our facility. SEG will be responsible for all burial ground fines and violations which relate to the packaging, method of solidification, quality of the solidified material, or other violations which SEG was directly responsible for. The utility will be responsible for the accuracy and certification of the oil, as being non-hazardous under RCRA and TSCA regulations.
7. **RADIONUCLIDE CONCENTRATION:** Oil with concentrations of radionuclides equal to or less than 1×10^{-4} microcuries per ml for fission products and 1×10^{-5} microcuries per ml for uranium when averaged over the entire batch or shipment and with no other significant alpha emitters comprising >10% of the total amount of the activity may be taken. If higher oil concentrations apply, contact SEG for permission to ship the oil.
8. **TRANSPORTATION SERVICES:** SEG will provide transportation in accordance with Attachment 3 (SEG's Radioactive Waste Services Agreement). The charges are summarized on the applicable fee schedule titled - Transportation.
9. **OIL DISPOSAL FEES:** SEG will burn and/or solidify radioactive oil on a per gallon basis based upon Attachment 3. The Attachment is based upon a per gallon price plus the cost of transportation and any sampling and laboratory analysis costs. A discount is usually provided to those clients that provide substantial DAW business to SEG (drums, boxes or sea lands).
10. **SEG LIMITS:** SEG will work with our client to quickly remove oils from their site to SEG for processing. The total of all oil backlogged at utilities exceeds on the short term the capacity of SEG to receive all of this oil at the same time. SEG will work with our client to schedule the burning of their oils or transfer of their oils to SEG's site for our backlog purposes.

**ATTACHMENT 2
TO SEG'S RADIOACTIVE WASTE SERVICES AGREEMENT
BURNING OF RADIOACTIVE OILS**

**PART 2.3 SUMMARY OF HAZARDOUS WASTE REGULATIONS RELATED TO OIL
ACCEPTANCE CRITERIA**

GENERAL STATEMENT

SEG is NOT a hazardous waste treatment, storage, or disposal facility. Therefore, SEG is NOT permitted to receive, accept, store, or process any client's regulated listed or characteristic hazardous waste.

In regard to specific regulations on used oil, SEG will accept non-hazardous oil as defined in the Resource Conservation Recovery Act (RCRA) 40 CFR, part 261. This part sets specific constituents/properties and the allowable levels. Additionally, used oil which contains PCBs as regulated by the Toxic Substance Control Act (TSCA), 40 CFR, part 761, would not be acceptable by SEG.

The term "hazardous" means that the material is regulated as such by a governing authority and has no reference to whether or not the material is "dangerous". For example, kerosene is dangerous but it is not hazardous since it is not defined as such by regulations. Furthermore, a waste is not necessarily "hazardous" by regulation even if tests show that the waste contains materials typically regulated as hazardous; it often depends on how the waste was generated. Thus, it is literally possible to have two identical containers of waste with one regulated as hazardous and the other not.

The discussion below is not intended to make the issue more complex than it obviously is; rather, its purpose is to provide SEG clients with the maximum flexibility allowed by law for the shipment to SEG of oil and similar materials contaminated with radioactive material. None of the comments below are special license or permit conditions at SEG. Rather, they are restatements of the current RCRA regulations as of February 1, 1988.

DEFINITION OF NONHAZARDOUS "OIL"

The following nonhazardous material may be accepted in pure form or as mixtures with each other or as mixtures with other nonhazardous (by regulation) materials; motor oil, hydraulic oil, transmission and power steering fluids, lubricating oils, kerosene, turpentine, most cutting oils, diesel fuel, and similar nonhazardous materials. Any such similar liquid material having a flash point above 140°F (60°C) and which is not listed or otherwise hazardous by regulation is acceptable. Generally, scintillation fluids are not accepted unless one of the exemptions below is met.

CHARACTERISTICALLY HAZARDOUS MATERIALS

IGNITABLE - Liquid materials not otherwise hazardous except for the characteristic of ignitability (flash point less than 140°F) are acceptable if the generator unintentionally or accidentally mixes it with the nonhazardous materials listed above. Thus, gasoline, mineral spirits, or other similar ignitable material mixed with oil is acceptable if the mixture flash point is greater than 140°F. However, a container of pure gasoline, mineral spirits, or other similar ignitable material (FP less than 140°F) is not acceptable at SEG.

CORROSIVE, REACTIVE, TOXIC CHARACTERISTIC (TC) - Oil containing a material which would cause it to exhibit one or more of these characteristics (e.g., a toxic characteristic metal such as hexavalent chromium or lead), as defined by regulation, is not acceptable. Oil containing small quantities of hazardous constituents is acceptable if the final mixture does not exhibit the characteristic and is also not a listed waste.

OIL CONTAMINATED WITH EMPTY-CONTAINER RESIDUES

The release left in "empty" containers as defined by regulation are not hazardous. Therefore, oils contaminated by such residues may be accepted as long as they do not exhibit a characteristic of a hazardous waste. An example is the toluene residue in an "empty" container. Even though toluene is a listed constituent, it is not regulated as hazardous under these conditions. Furthermore, a nonhazardous waste stored in that container and which becomes contaminated with the toluene residue does not become a hazardous waste even though it now contains a constituent which is regulated as a "listed" waste under certain conditions. It is important that the regulatory definition of "empty" be met; simply "emptying" a container may not qualify the container as "empty", especially with acute hazardous wastes, which require triple rinsing to qualify as "empty".

SPECIAL RULES FOR HALOGENATED SOLVENTS (F001-F002)

Mixtures of hazardous waste and used oil ordinarily are classified as hazardous waste. However, both used oil and hazardous halogenated solvents are frequently generated by the same facility, and some incidental contamination is inevitable. Therefore, some specific rules exist for halogenated solvents in used oil.

Any used oil containing more than 1,000 ppm and up to 4,000 ppm of total halogens is presumed to be a hazardous waste because it was mixed with halogenated hazardous waste. Persons may rebut this presumption by demonstrating that the used oil does not contain significant concentrations of halogenated hazardous constituents. Some possible examples of rebuttal are:

1. Show that the used oil contains less than 100 ppm of any individual hazardous halogenated component listed as a hazardous spent solvent.
2. Show that the hazardous constituents could have been added or formed during use of the oil.

There are possible other rebuttable presumptions depending on the circumstances specific to individual cases. If you have any questions regarding the acceptability of your used oil, contact you SEG representative.

ACCEPTABILITY OF OTHER HAZARDOUS WASTES

Any listed or characteristic hazardous waste not exempt above is, most likely, not acceptable to SEG. In summary, to determine if used oil may or may not be accepted by SEG, many factors such as the generating process, mixing characteristics, etc., may to be reviewed to determine acceptance. Please contact your SEG representative.

METAL ACCEPTANCE

1. Size Maximum is a piece or a combination of pieces that can be placed in a 20 foot sealand.
- Weight Maximum weight of a single piece is 20,000.
2. Rad Level Average contact reading without any shielding.

- A. Shield Material 0 - 50 mr/hr
- B. Volume Reduction for Burial 51 - 200 mr/hr

Note: Any material >200 requires prior permission from SEG, and no single piece to exceed 1000 MR on contact. The standard Radwaste surcharge shall apply.

Special Nuclear Materials* (U233-U235)	.1 gm/cf
Transuranic* (Including Pu241)	<1 nanoci/gm
Activated Metal	0.1 mr/hr on contact
Ra 226 (DOE only)	<10 nanoci/gram
Ra 226 (Commercial) requires special permission.	

- * Subject to pre-verification approval. Materials which are not metal will be billed by the appropriate rate. Asbestos materials require special permission.

APPENDIX H

OPEN LITERATURE CITATIONS FOR SELECTED MIXED WASTE TREATMENT TECHNOLOGIES

APPENDIX H

OPEN LITERATURE CITATIONS FOR SELECTED MIXED WASTE TREATMENT TECHNOLOGIES

A search of the open literature publications from October 1990 to June 1992 for waste treatment technologies resulted in 902 citations. The data bases searched included: Biotechnology Abstracts, DOE Energy, Enviroline, Federal Register, Federal Research in Progress, National Technical Information Service, Pollution Abstracts, and Environmental Bibliography. The search included mixed, hazardous, and low-level radioactive waste and treatment categories listed in Tables 5.2 and 5.3 of Sect. 5, The Treatability of Mixed Waste. The treatment categories and number of citations are summarized below:

Incineration	299 citations;
Thermal Recovery	9 citations;
Vitrification	234 citations;
Solidification	173 citations;
Stabilization	139 citations;
Acid Leaching	10 citations;
Chemical Treatment	13 citations;
Neutralization	25 citations.

Examples of the citations, which are arranged chronologically according to treatment category along with annotated abstracts and citation information, are presented in this appendix. The entire citation database can be obtained by submitting a request and a blank 3.5 in. floppy disk (1.4 Mb size) to:

OAK RIDGE NATIONAL LABORATORY
Attention: Dr. J. A. Klein
Nuclear Waste Studies and Applications
P.O. Box 2008, MS 6495
Oak Ridge, Tennessee 37831-9984
Telephone No. (615) 574-6823

Although grouped according to major treatment category, many citations will include information about other treatment technologies. Thus, in lieu of an index, reading of the citations (or a computer search) is recommended in order to make greater use of the citation data. (Because of their length, generally only titles and citation information are included for Federal Register citations.)

A previously conducted search for the 1987 to 1990 time period resulted in 412 citations. This database is also available on request from Dr. Klein, arranged according to treatment categories.

INCINERATION

10/7/25 (Item 25 from file: 103)

03253282 JPN-91-011202; EDB-92-016039

Title: Overall reaction rate analysis of ion-exchange resins incineration by fluidized bed

Author(s): Kinoshita, Koki; Hirata, Masaru; Yahata, Taneaki (Japan Atomic Energy Research Inst., Oarai, Ibaraki (Japan). Oarai Research Establishment)

Source: Journal of Nuclear Science and Technology (Tokyo) (Japan) v 28:8.

Coden: JNSTA ISSN: 0022-3131

Publication Date: Aug 1991 p 739-747

Language: In English

Abstract: A kinetic study on the incineration of ion-exchange resins was conducted using fluidized bed. In the experiment, cation or anion exchange resins with known quantities were fed into the fluidized bed maintained at a constant temperature from 550 to 750degC. The apparent reaction rate constants k_{ap} could be evaluated by the time for completion of combustion derived from the continuous measurement of CO_2 concentration in the off-gas. It was confirmed that the reaction of the ion-exchange resins proceeded with the shrinking particle model forming no solid product layer and the rate of disappearance of the resins could be expressed by the surface chemical reaction. Most preferable conditions for incinerating the ion-exchange resins were found to be about 650degC for temperature and more than $4.91 \times 10^{-2} m \cdot s^{-1}$ for the air velocities at fluidized bed u_B . Also, k_{ap} for cation and anion exchange resins were found to be 1.25×10^{-2} and $1.51 \times 10^{-2} s^{-1}$, respectively, at 650degC and u_B of $5.45 \times 10^{-2} m \cdot s^{-1}$. (author).

10/7/26 (Item 26 from file: 103)

03252039 NTS-92-008675; EDB-92-014796

Title: Safety in the ARIES-III D- sup 3 He tokamak reactor design

Author(s)/Editor(s): Herring, J.S.; Dolan, T.J.

Corporate Source: EG and G Idaho, Inc., Idaho Falls, ID (United States)

Sponsoring Organization: DOE USDOE, Washington, DC (United States)

Conference Title: 14. IEEE symposium on fusion engineering

Conference Location: San Diego, CA (United States) Conference Date: 30 Sep - 3 Oct 1991

Publication Date: 1991 (5 p)

Report Number(s): EGG-M-91280 CONF-910968--40

Order Number: DE92003289

Contract Number (DOE): AC07-76ID01570

Language: In English

Availability: OSTI; NTIS; INIS; GPO Dep.

Abstract: The ARIES-3 reactor study is an extensive examination of the viability of a D-³He-fueled commercial tokamak power reactor. Because neutrons are produced only through side reactions, the reactor has the significant advantages of reduced activation of the first wall and shield, low afterheat and Class A or C low level waste disposal. Since no tritium is required for operation, no lithium-containing breeding blanket is necessary. A ferritic steel shield behind the first wall protects the magnets from gamma and neutron heating and from radiation damage. The ARIES-3 reactor uses an organic coolant to cool the first wall, shield and divertor. The organic coolant has a low

efficiency. Radiation damage requires processing the coolant to remove and crack radiolytic products that would otherwise foul cooling surfaces. The cracking process produces waste, which must be disposed of through incineration or burial. We estimated the offsite doses due to incineration at five candidate locations. The plasma confinement requirements for a D-³He reactor are much more challenging than those for a D-T reactor. Thus, the demands on the divertor are more severe, particularly during a disruption. We explored the potential for isotopically tailoring the 4 mm tungsten layer on the divertor in order to reduce the offsite doses should a tungsten aerosol be released from the reactor after an accident. We also modeled a loss-of-cooling accident in which the organic coolant was burning in order to estimate the amount of radionuclides released from the first wall. We analyzed the disposition of the 20 g/day of tritium that is produced by D-D reactions and removed by the vacuum pumps. For our reference design, the tritium will be burned in the plasma. These results re-emphasize the need for low activation materials and advanced divertor designs, even in reactors using advanced fuels.

10/7/27 (Item 27 from file: 103)

03249963 GRA-91-91879; EDB-92-012720

Title: Waste-minimization assessment for a manufacturer of speed-reduction equipment. Environmental Research Brief

Author(s)/Editor(s): Kirsch, F.W.; Maginn, J.C.

Corporate Source: University City Science Center, Philadelphia, PA (United States)

Publication Date: Oct 1991 (5 p)

Report Number(s): PB-92-104363/XAB

Contract Number (Non-DOE): EPA-R814903

Note: Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Language: In English

Availability: NTIS

Abstract: The U.S. Environmental Protection Agency (EPA) has funded a pilot project to assist small- and medium-size manufacturers who want to minimize their generation of hazardous waste but who lack the expertise to do so. Waste Minimization Assessment Centers (WMACs) were established at selected universities and procedures were adapted from the EPA Waste Minimization Opportunity Assessment Manual (EPA/625/7-88/003, July 1988). The WMAC team at Colorado State University performed an assessment at a plant manufacturing speed reduction equipment -- approximately 110,000 speed reduction units/yr. Plant operations include machining and assembling parts for worn gear shafts and other shafts, worn gear bodies, hubs and housings, bearings and seals. Keyed and threaded shafts are case-hardened, ground with a thread grinder, and deburred. Component parts are washed with an aqueous cleaner before assembly, and finished assemblies are spray painted with solvent-based paints and lacquer thinner. Spent cutting fluid and sludge, including turnings, and spent wash water are shipped offsite for disposal. Spent hydraulic oil and non-aqueous cutting fluid are shipped to a recycler. Waste paint and spent lacquer thinner are shipped offsite for incineration. The team's report, detailing findings and recommendations, indicated that most waste consists of spent aqueous cutting fluid, and that the greatest savings could be obtained by ultrafiltration and recycle of spent wash water.

THERMAL RECOVERY

9/9/2 (Item 2 from file: 103)

03283988 NOV-92-014231; EDB-92-046745

Title: Environmental aspects of heavy-oil recovery by thermal EOR processes

Author(s): Sarathi, P. (National Inst. for Petroleum and Energy Research (US))

Source: Journal of Petroleum Technology (United States) v 43:6. Coden:

JPTJA ISSN: 0022-3522

Publication Date: Jun 1991 p 662-667

Document Type: Journal Article

Language: In English

Journal Announcement: EDB9208

Subfile: ETD (Energy Technology Data Exchange); INS (US Atomindex input). NOV (DOE contractor)

US DOE Project/NonDOE Project: NP

Country of Origin: United States

Country of Publication: United States

Abstract: This paper summarizes the major U.S. and State of California environmental regulations relevant to thermal EOR processes and assesses their impact on the process. The environmental laws that have the greatest impact on thermal EOR processes pertain to air quality, water quality, hazardous wastes, and environmental quality. This paper also identifies the source and type of pollutant likely to be generated in a typical thermal EOR facility.

Major Descriptors: *ENVIRONMENTAL POLICY -- THERMAL RECOVERY; *THERMAL RECOVERY -- ENVIRONMENTAL POLICY; *THERMAL RECOVERY -- POLLUTION SOURCES

Descriptors: AIR QUALITY; CALIFORNIA; ENHANCED RECOVERY; HAZARDOUS MATERIALS; POLLUTANTS; REGULATIONS; USA; WASTES; WATER QUALITY

Broader Terms: DEVELOPED COUNTRIES; ENHANCED RECOVERY; ENVIRONMENTAL QUALITY; GOVERNMENT POLICIES; MATERIALS; NORTH AMERICA; RECOVERY; USA

Subject Categories: 021000* -- Petroleum -- Legislation & Regulations

020900 -- Petroleum -- Environmental Aspects

INIS Subject Categories: C5612* -- Environmental aspects of petroleum -- (1992-)

9/9/3 (Item 3 from file: 103)

03283967 NOV-92-014230; EDB-92-046724

Title: Control of waste gas from a thermal EOR operation

Author(s): Peavy, M.A.; Braun, J.E. (Oryx Energy Co. (US))

Source: Journal of Petroleum Technology (United States) v 43:6. Coden:

JPTJA ISSN: 0022-3522

Publication Date: Jun 1991 p 656-661

Document Type: Journal Article

Language: In English

Journal Announcement: EDB9208

Subfile: ETD (Energy Technology Data Exchange). NOV (DOE contractor)

US DOE Project/NonDOE Project: NP

Country of Origin: United States

Country of Publication: United States

Abstract: This paper summarizes a waste-gas treatment system designed to control emissions from thermal EOR wells. This case study discusses the need, design, installation, and operation of the system.

Major Descriptors: *GASEOUS WASTES -- WASTE PROCESSING; *THERMAL RECOVERY -- GASEOUS WASTES

Descriptors: AIR POLLUTION CONTROL; DESIGN; EMISSION; ENHANCED RECOVERY; INSTALLATION; OPERATION

Broader Terms: CONTROL; ENHANCED RECOVERY; MANAGEMENT; POLLUTION CONTROL; PROCESSING; RECOVERY; WASTE MANAGEMENT; WASTES

Subject Categories: 020800* -- Petroleum -- Waste Management

9/9/4 (Item 4 from file: 103)

02931389 GRA-90-72630; EDB-90-148633; ERA-15-049524

Title: Final response to BDAT related comments document. D009, K044, K045, K047, D011, P119, P120, and P and U wastes. Volume 1-I

Author(s)/Editor(s): Rosengrant, L.; Craig, R.

Corporate Source: Environmental Protection Agency, Washington, DC (USA).
Office of Solid Waste (Code: 9513743)

Publication Date: May 1990 (246 p)

Report Number(s): PB-90-234584/XAB EPA--530/SW-90/061K

Contract Number (Non-DOE): EPA-68-W9-0068

Note: See also Volume 1-H, PB--90-234576 and Volume 1-J, PB--90-234592.

Also available in set of 19 reports PC E99/MF E99, PB--90-234477

Document Type: Report

Language: In English

Journal Announcement: EDB9020

Availability: NTIS, PC A11/MF A02

Distribution: (Report):9 (MF):6 ND-00

Subfile: EPA (Energy Abstracts for Policy Analysis); ERA (Energy Research Abstracts); ETD (Energy Technology Data Exchange). GRA (NTIS NTS)

US DOE Project/NonDOE Project: NP

Country of Origin: United States

Country of Publication: United States

Abstract: The contents of this article include the following:

characteristic wastes for mercury p and u wastes containing mercury (data submission only, thermal recovery standard-demonstrability, establishment of bdat standard level below the characteristic level, stabilization as bdat or sulfide precipitated d009 as bdat, alternative treatment for debris and other wastes, reconsideration of the retort cutoff level, treatment standard mixed waste, and indigenous waste); wastes from the manufacturing and processing of explosives (treatment standard); characteristic wastes for silver (treatment standards, precipitation, and concentration-based standards vs. recovery or stabilization); vanadium containing wastes (treatment technology, waste classification, treatment standards, and data submission); and p and u wastes containing thallium (data submission).

Major Descriptors: *MERCURY -- STANDARDS

Descriptors: COMPLIANCE; DATA PROCESSING; EXPLOSIVES; GROUND DISPOSAL; HAZARDOUS MATERIALS; INDUSTRIAL WASTES; LEACHING; POLLUTION REGULATIONS; REMEDIAL ACTION; SILVER; STABILIZATION; SULFIDES; TECHNOLOGY UTILIZATION; THALLIUM; VANADIUM; WASTE PROCESSING; WASTE WATER

Broader Terms: CHALCOGENIDES; DISSOLUTION; ELEMENTS; HYDROGEN COMPOUNDS; LIQUID WASTES; MANAGEMENT; MATERIALS; METALS; OXYGEN COMPOUNDS; PROCESSING; REGULATIONS; SEPARATION PROCESSES; SULFUR COMPOUNDS; TRANSITION ELEMENTS; WASTE DISPOSAL; WASTE MANAGEMENT; WASTES; WATER

Subject Categories: 540120* -- Environment, Atmospheric -- Chemicals

Monitoring & Transport -- (1990-)

540220 -- Environment, Terrestrial -- Chemicals Monitoring & Transport -- (1990-)

540320 -- Environment, Aquatic -- Chemicals Monitoring & Transport -- (1990-)

290300 -- Energy Planning & Policy -- Environment, Health, & Safety

VITRIFICATION

19/7/3 (Item 3 from file: 103)

03294907 EDB-92-057664

Title: The Hanford Waste Vittrification Plant Project Technology Exchange program

Author(s)/Editor(s): Woodcock, G.; Westphal, L.O.

Corporate Source: Westinghouse Hanford Co., Richland, WA (United States)

Sponsoring Organization: DOE USDOE, Washington, DC (United States)

Conference Title: American Nuclear Society annual meeting

Conference Location: Boston, MA (United States) Conference Date: 7-12 Jun 1992

Publication Date: Jan 1992 (6 p)

Report Number(s): WHC-SA-1427 CONF-920606--10

Order Number: DE92008081

Contract Number (DOE): AC06-87RL10930

Language: In English

Availability: OSTI; NTIS; INIS; GPO Dep.

Abstract: The status of the Hanford Waste Vittrification Plant (HWVP) Project is discussed, with its relationship to other waste vittrification efforts in the United States and abroad. The focus of this paper is on the benefits of the Technical Exchange program as a vehicle for making scientific, technical, and engineering data developed at a given site available to all organizations with interest in waste vittrification.

19/7/4 (Item 4 from file: 103)

03293700 EDB-92-056457

Title: Analyses of SRS waste glass buried in granite in Sweden and salt in the United States

Author(s)/Editor(s): Williams, J.P. (Tuskegee Inst., AL (United States));

Wicks, G.G. (Westinghouse Savannah River Co., Aiken, SC (United

States)); Clark, D.E. (Florida Univ., Gainesville, FL (United States))

; Lodding, A.R. (Chalmers Tekniska Hoegskola, Goeteborg (Sweden))

Corporate Source: Westinghouse Savannah River Co., Aiken, SC (United States)

Sponsoring Organization: DOE USDOE, Washington, DC (United States)

Conference Title: 5. international symposium on ceramics in nuclear and hazardous waste management

Conference Location: Cincinnati, OH (United States) Conference Date: 29 Apr - 3 May 1991

Publication Date: 1991 (13 p)

Report Number(s): WSRC-MS-90-370 CONF-9104261--6

Order Number: DE92009419

Contract Number (DOE): AC09-89SR18035

Language: In English

Availability: OSTI; NTIS; INIS; GPO Dep.

Abstract: Simulated Savannah River Site (SRS) waste glass forms have been buried in the granite geology of the Stirpa mine in Sweden for two years. Analyses of glass surfaces provided a measure of the performance of the waste glasses as a function of time. Similar SRS waste glass compositions have also been buried in salt at the WIPP facility in Carlsbad, New Mexico for a similar time period. Analyses of the SRS waste glasses buried in-situ in granite will be presented and compared to the performance of these same compositions buried in salt at WIPP.

19/7/5 (Item 5 from file: 103)

03293699 EDB-92-056456

Title: The DWPF product composition control system at Savannah River:

Statistical process control algorithm

Author(s)/Editor(s): Postles, R.L.; Brown, K.G.

Corporate Source: Westinghouse Savannah River Co., Aiken, SC (United States)

Sponsoring Organization: DOE USDOE, Washington, DC (United States)

Conference Title: Symposium on nuclear waste management

Conference Location: Cincinnati, OH (United States) Conference Date: 28 Apr - 2 May 1991

Publication Date: 1991 (11 p)

Report Number(s): WSRC-MS-91-104 CONF-9104256--15

Order Number: DE92009804

Contract Number (DOE): AC09-89SR18035

Language: In English

Availability: OSTI; NTIS; GPO Dep.

Abstract: The DWPF Process batch-blends aqueous radwaste (PHA) with solid radwaste (Sludge) in a waste receipt vessel (the SRAT). The resulting SRAT-Batch is transferred to the next process vessel (the SME) and there blended with ground glass (Frit) to produce a batch of feed slurry. The SME-Batch is passed to a subsequent hold tank (the MFT) which feeds a Melter continuously. The Melter produces a molten glass wasteform which is poured into stainless steel canisters for cooling and, ultimately, shipment to and storage in a geologic Repository. The Repository will require that the glass wasteform be resistant to leaching by any underground water that might contact it. In addition, there are processing constraints on Viscosity and Liquidus Temperature of the melt. The Product Composition Control System (PCCS) is the system intended to ensure that the melt will be Processible and that the glass wasteform will be Acceptable. Within the PCCS, the SPC Algorithm is the device which guides control of the DWPF process. The SPC Algorithm is needed to control the multivariate DWPF process in the face of uncertainties (variances and covariances) which arise from this process and its supply, sampling, modeling, and measurement systems.

19/7/6 (Item 6 from file: 103)

03293697 EDB-92-056454

Title: Numerical simulation of high-level radioactive nuclear waste glass production

Author(s)/Editor(s): Choi, I.G. (Westinghouse Savannah River Co., Aiken, SC (United States)); Ugan, A. (Purdue Univ., Indianapolis, IN (United States). Dept. of Mechanical Engineering)

Corporate Source: Westinghouse Savannah River Co., Aiken, SC (United States)

Sponsoring Organization: DOE USDOE, Washington, DC (United States)

Conference Title: International waste management conference

Conference Location: Seoul (Korea, Republic of) **Conference Date:** 21-26 Oct 1991

Publication Date: 1991 (10 p)

Report Number(s): WSRC-MS-91-099 CONF-911040--13

Order Number: DE92009901

Contract Number (DOE): AC09-89SR18035

Language: In English

Availability: OSTI; NTIS; INIS; GPO Dep.

Abstract: Vitrification of radioactive waste has become an international approach for converting highly radioactive wastes into a durable solid prior to placing them in a permanent disposal repository. The technology for the process is not new. The conversion melter is a direct descendant of all electric melters used for manufacturing of some commercial glass types. Therefore, the vitrification process of radioactive wastes inherits typical problems of all electric furnaces and creates some other specific problems such as noble metal sedimentation. The noble metals and nickel sulfides in the melter are heavier than molten glass and have a low solubility. In a reducing condition, these metals amalgamate and tend to settle on the melter floor. The metal deposit resulting from this settling has a potential to short circuit the melter. The objective of this paper is to identify the typical problems that have been encountered in the waste melter operations and to address how these problems can be tackled using state-of-the-art numerical simulation techniques. It is believed that the large amount of pilot-scale melter experience throughout the world, combined with the knowledge gained from state-of-the-art computer modeling techniques would give assurance that the existing and future radioactive wastes can be effectively converted into a durable glass material and safely placed in a permanent repository.

SOLIDIFICATION

15/7/3 (Item 3 from file: 103)

03293671 EDB-92-056428

Title: Choosing solidification or vitrification for low-level radioactive and mixed waste treatment

Author(s)/Editor(s): Gimpel, R.F.

Corporate Source: Westinghouse Environmental Management Co. of Ohio, Cincinnati, OH (United States).
Fernald Environmental Management Project

Sponsoring Organization: DOE USDOE, Washington, DC (United States)

Conference Title: Annual meeting of the Air and Waste Management Association (AWMA)

Conference Location: Kansas City, MO (United States) Conference Date: 21-26 Jun 1992

Publication Date: 14 Feb 1992 (16 p)

Report Number(s): FEMP-2256 CONF-9206114--2

Order Number: DE92009077

Contract Number (DOE): AC05-86OR21600

Language: In English

Availability: OSTI; NTIS; INIS; GPO Dep.

Abstract: Solidification (making concrete) and vitrification (making glass) are frequently the treatment methods recommended for treating inorganic or radioactive wastes. Solidification is generally perceived as the most economical treatment method. Whereas, vitrification is considered (by many) as the most effective of all treatment methods. Unfortunately, vitrification has acquired the stigma that it is too expensive to receive further consideration as an alternative to solidification in high volume treatment applications. Ironically, economic studies, as presented in this paper, show that vitrification may be more competitive in some high volume applications. Ex-situ solidification and vitrification are the competing methods for treating in excess of 450,000m³ of low-level radioactive and mixed waste at the Fernald Environmental Management Project (FEMP or simply, Fernald) located near Cincinnati, Ohio. This paper summarizes how Fernald is choosing between solidification and vitrification as the primary waste treatment method.

15/7/4 (Item 4 from file: 103)

03293659 EDB-92-056416

Title: Polyethylene encapsulation of mixed wastes: Scale-up feasibility

Author(s)/Editor(s): Kalb, P.D.; Heiser, J.H.; Colombo, P.

Corporate Source: Brookhaven National Lab., Upton, NY (United States)

Sponsoring Organization: DOE USDOE, Washington, DC (United States)

Conference Title: Waste management '92

Conference Location: Tucson, AZ (United States) Conference Date: 1-5 Mar 1992

Publication Date: 1991 (9 p)

Report Number(s): BNL-47122 CONF-920307--46

Order Number: DE92010046

Contract Number (DOE): AC02-76CH00016

Language: In English

Availability: OSTI; NTIS; INIS; GPO Dep.

Abstract: A polyethylene process for the improved encapsulation of radioactive, hazardous, and mixed wastes have been developed at Brookhaven National Laboratory (BNL). Improvements in waste loading and waste form performance have been demonstrated through bench-scale development and testing. Maximum waste loadings of up to 70 dry wt % mixed waste nitrate salt were achieved, compared with 13--20 dry wt % using conventional cement processes. Stability under anticipated storage and disposal conditions and compliance with applicable hazardous waste regulations were demonstrated through a series of lab-scale waste form performance tests. Full-scale demonstration of this process using actual or surrogate waste is currently planned. A scale-up feasibility test was successfully conducted, demonstrating the ability to process nitrate salts at production rates (up to 450 kg/hr) and the close agreement between bench- and full-scale process parameters. Cored samples from the resulting pilot-scale (114 liter) waste form were used to verify homogeneity and to provide additional specimens for confirmatory performance testing.

15/7/5 (Item 5 from file: 103)

03293635 EDB-92-056392

Title: Initial demonstration of DWPF process and product control strategy using actual radioactive waste

Author(s)/Editor(s): Andrews, M.K.; Bibler, N.E.; Jantzen, C.M.; Beam, D.C.
Corporate Source: Westinghouse Savannah River Co., Aiken, SC (United States)
Sponsoring Organization: DOE USDOE, Washington, DC (United States)
Conference Title: 93. annual meeting and exposition of the American Ceramic Society (ACerS)
Conference Location: Cincinnati, OH (United States) Conference Date: 28 Apr - 2 May 1991
Publication Date: 1991 (14 p)
Report Number(s): WSRC-MS-91-012 CONF-910430--23
Order Number: DE92009635
Contract Number (DOE): AC09-89SR18035
Language: In English
Availability: OSTI; NTIS; INIS; GPO Dep.

Abstract: The Defense Waste Processing Facility at the Savannah River Site (SRS) will vitrify high-level nuclear waste into borosilicate glass. The waste will be mixed with properly formulated glass-making frit and fed to a melter at 1150{degrees}C. Process control and product quality are ensured by proper control of the melter feed composition. Algorithms have been developed to predict the processability of the melt and the durability of the final glass based on this feed composition. To test these algorithms, an actual radioactive waste contained in a shielded facility at SRS was analyzed and a frit composition formulated using a simple computer spreadsheet which contained the algorithms. This frit was then mixed with the waste and the resulting slurry fed to a research scale, joule-heated melter operated remotely. Approximately 24 kg of glass were successfully prepared. This paper will describe the frit formulation, the vitrification process, and the glass durability.

15/7/6 (Item 6 from file: 103)
03287805 AIX-23-024974; EDB-92-050562
Title: Polymers in the nuclear power industry
Author(s): Phillips, D.C.; Burnay, S.G. (AEA Industrial Technology, Harwell (United Kingdom))
Title: Irradiation effects on polymers
Author(s)/Editor(s): Clegg, D.W.; Collyer, A.A. (Sheffield Polytechnic (United Kingdom)) (eds.)
Publisher: London (United Kingdom) Elsevier Applied Science
Publication Date: 1991 p 345-381 (460 p)
ISBN: 1-85166-563-3
Language: In English

Abstract: This chapter is concerned with practical uses of organic polymers in the nuclear industry in applications where they are subjected to high energy radiation. Materials based on organic polymers are used as widely in the nuclear industry because of their versatility, low cost, ease of manufacture, corrosion resistance, and many other advantages which make them attractive for a wide range of applications. They are used for coatings, seals, cables containers, gloveboxes for example. However, these materials are susceptible to damage by ionising radiation with resulting changes in properties. The following have been looked at in detail: coatings and liners, plastic surfaces, seals and cables. Polymeric materials have also been considered for the immobilisation of intermediate level radioactive waste. (author).

STABILIZATION

11/7/12 (Item 12 from file: 103)

03275974 EDB-92-038731

Title: Fiscal year 1992 program plan for evaluation and remediation of the generation and release of flammable gases in Hanford Site waste tanks

Author(s)/Editor(s): Johnson, G.D.

Corporate Source: Westinghouse Hanford Co., Richland, WA (United States)

Sponsoring Organization: DOE USDOE, Washington, DC (United States)

Publication Date: Jan 1992 (85 p)

Report Number(s): WHC-EP-0537

Order Number: DE92008383

Contract Number (DOE): AC06-87RL10930

Language: In English

Availability: OSTI; NTIS; INIS; GPO Dep.

Abstract: The Waste Tank Flammable Gas Stabilization Program was established in 1990 to provide for resolution of a major safety issue identified for 23 of the high-level waste tanks at the Hanford Site. This safety issue involves flammable gas mixtures, consisting mainly of hydrogen, nitrous oxide, and nitrogen, that are generated and periodically released in concentrations that exceed the lower flammability limit. Initial activities of the program have been directed at Tank 241-SY-101 because it exhibits the largest risk. The purpose of this document is to provide a brief description of the FY 1992 priorities, logic, work breakdown structure (WBS) and task descriptions for the Waste Tank Flammable Gas Stabilization Program. A major change for FY 1992 involves the core sampling and sample analyses. All activities associated with these tasks will be conducted under the Tank Waste Characterization Program (1N4). Resource requirements for the Waste Tank Flammable Gas Stabilization Program for fiscal years beyond 1) are given in the Waste Tank Safety Program Overview Plant (Gasper 1991).

11/7/9 (Item 9 from file: 103)

03284437 EDB-92-047194

Title: Technology needs for treatment of DOE's low-level mixed wastes

Author(s)/Editor(s): Harmon, L.H.; Rhoderick, J.E. (USDOE Office of Environmental Restoration and Waste Management, Washington, DC (United States). Office of Waste Operations); Borduin, L.C. (Los Alamos National Lab., NM (United States)); Musgrave, B.C. (Lawrence Livermore National Lab., CA (United States)); Ross, W.A. (Pacific Northwest Lab., Richland, WA (United States))

Corporate Source: Los Alamos National Lab., NM (United States)

Sponsoring Organization: DOE USDOE, Washington, DC (United States)

Conference Title: Waste management '92

Conference Location: Tucson, AZ (United States) Conference Date: 1-5 Mar 1992

Publication Date: 1992 (17 p)

Report Number(s): LA-UR-92-644 CONF-920307--30

Order Number: DE92008481

Contract Number (DOE): W-7405-ENG-36

Language: In English

Availability: OSTI; NTIS; INIS; GPO Dep.

Abstract: The US Department of Energy (DOE) stores and generates significant amounts of low-level mixed wastes (LLMW) consisting of radioactive materials mixed with hazardous chemical substances. Many of these wastes are regulated under the US Environmental Protection Agency (EPA) Land Disposal Restrictions and must be treated and disposed in compliance with applicable state and federal requirements. In general, treatment requirements include elimination of organic hazardous constituents and stabilization of inorganic hazardous constituents. Final waste forms must meet both EPA leach testing and DOE disposal acceptance criteria. The DOE currently does not have an adequate capability to meet these treatment objectives. The Mixed Waste Treatment Project has been established by the DOE to define needed LLMW

treatment capabilities as a basis for either a prototype plant design or an existing facility modifications. Existing DOE mixed waste data bases were analyzed to identify the range of waste quantities and types and to define broad treatment categories needed to bring these wastes into compliance. Using these treatment categories as a starting point, we constructed a baseline flow sheet defining process steps from receipt through final form. From this baseline flow sheet, we developed functional and operational requirements (F ORs) for each process train. An initial set of near-term technologies was identified for each process step, and alternative near- and long-term options were listed. Based on these analyses, we identified technology gaps and improvement needs in the areas of characterization, waste handling, segregation and sorting, size reduction, decontamination, materials recycle, primary and secondary treatment for RCRA compliance, offgas treatment, and final waste forms.

11/7/6 (Item 6 from file: 103)

03293611 EDB-92-056368

Title: ISV of a simulated seepage trench: A Radioactive Field Test at ORNL

Author(s)/Editor(s): Tixier, J.S.; Powell, T.D. (Pacific Northwest Lab., Richland, WA (United States)); Jacobs, G.K.; Spalding, B.P. (Oak Ridge National Lab., TN (United States))

Corporate Source: Oak Ridge National Lab., TN (United States)

Sponsoring Organization: DOE USDOE, Washington, DC (United States)

Conference Title: American Nuclear Society annual meeting

Conference Location: Boston, MA (United States) Conference Date: 7-12 Jun 1992

Publication Date: 1992 (6 p)

Report Number(s): CONF-920606-8

Order Number: DE92007832

Contract Number (DOE): AC05-84OR21400; AC06-76RL01830

Language: In English

Availability: OSTI; NTIS; INIS; GPO Dep.

Abstract: The pits and trenches used at Oak Ridge National Laboratory (ORNL) from 1951 through 1966 to dispose of over a million curies of radioactive liquid wastes are currently undergoing remedial investigations/feasibility studies to identify potential technologies for cleanup and/or stabilization. In situ vitrification (ISV) is a leading technology candidate because of the high risks associated with options requiring retrieval, and because of the high-quality waste form produced by ISV. The Radioactive Field Test, conducted on a simulated ORNL seepage trench, in May 1991, is the second step in evaluating ISV as a remedial action at these sites. This document discusses this field test.

ACID LEACHING

6/7/6 (Item 6 from file: 103)

02897784 GRA-90-01940; EDB-90-115025; ERA-15-040389; INS-90-029266

Title: Uranium ore treatment. June 1981-March 1990 (A Bibliography from the COMPENDEX data base). Report for June 1981-March 1990

Corporate Source: National Technical Information Service, Springfield, VA (USA)

Publication Date: May 1990 (110 p)

Report Number(s): PB-90-869785/XAB

Note: Supersedes PB--81-864290. See also PB--90-869777

Language: In English

Availability: NTISPC N01/MF N01

Abstract: The treatment of uranium ores is reviewed with emphasis placed on acid leaching as the primary step in the process. Tailing disposal and proper handling of radioactive materials is emphasized. Primary treatment procedures include ion-exchange, sulfuric acid leaching, solvent extraction, and sedimentation. Environmental aspects of uranium milling and mining are examined in a related published bibliography. (This updated bibliography contains 265 citations, all of which are new entries to the previous edition.)

6/7/7 (Item 7 from file: 103)

02897783 GRA-90-01939; EDB-90-115024; ERA-15-040388; INS-90-029265

Title: Uranium ore treatment. January 1970-May 1981 (A Bibliography from the COMPENDEX data base). Report for January 1970-May 1981

Corporate Source: National Technical Information Service, Springfield, VA (USA)

Publication Date: May 1990 (267 p)

Report Number(s): PB-90-869777/XAB

Note: See also PB--90-869785

Language: In English

Availability: NTISPC N01/MF N01

Abstract: The treatment of uranium ores is reviewed with emphasis placed on acid leaching as the primary step in the process. Tailing disposal and proper handling of radioactive materials is emphasized. Primary treatment procedures include ion-exchange, sulfuric acid leaching, solvent extraction, and sedimentation. Environmental aspects of uranium milling and mining are examined in a related published bibliography. (This updated bibliography contains 300 citations, none of which are new entries to the previous edition.)

6/7/8 (Item 1 from file: 6)

1475987 NTIS Accession Number: PB90-234618/XAB

Final Response to BDAT Related Comments Document. K071 and K106: Mercury Cell Process Wastes K086: Residues from Ink Production Wastes Containing Cyanide. Volume 1-L

Rosengrant, L. ; Craig, R.

Environmental Protection Agency, Washington, DC. Office of Solid Waste Corp.

Source Codes: 031287518

Report No.: EPA/530/SW-90/061N May 90 251p

Languages: English

Journal Announcement: GRAI9020

See also Volume 1-K, PB90-234600 and Volume 1-M, PB90-234626.

Also available in set of 19 reports PC E99/MF E99, PB90-234477.

NTIS Prices: PC A12/MF A02

Country of Publication: United States

Contents: Mercury cell process wastes (data submission only, thermal recovery standard-demonstrability, treatment standard for K071 and K106 wastewater, multimedia impacts, stabilization as BDAT option, retain existing BDAT standard for K071 nonwastewater, reconsideration of retort cutoff level, and indigenous waste); Chlorinated hydrocarbon wastes (no comments were received for this waste code); Residues from ink production (treatment standards, subcategories, total chromium vs hexavalent chromium, mixture and derived-from rule, and soft hammer); Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting (no comments were received for this issue); Wastes containing cyanide (analytical methodology, BDAT, treatment standards, and soil/debris).

6/7/9 (Item 2 from file: 6)

1475939 NTIS Accession Number: PB90-234121/XAB

Final Treatment Standards for Nonwastewater and Wastewater Forms of K100. Volume 12 (Memorandum rept)
Paintal, A. S.

Versar, Inc., Springfield, VA.

Corp. Source Codes: 060372000

Sponsor: Environmental Protection Agency, Washington, DC. Office of Solid Waste.

Report No.: EPA/530/SW-90/059L 8 May 90 38p

Languages: English

Journal Announcement: GRAI9020

See also Volume 11, PB90-234113 and Volume 13, PB90-234139. Sponsored by

Environmental Protection Agency, Washington, DC. Office of Solid Waste.

Also available in set of 25 reports PC E99/MF E99, PB90-234006.

NTIS Prices: PC A03/MF A01

Country of Publication: United States

Contract No.: EPA-68-W9-0068

Contents: The memorandum presents the technical support and rationale for the development of treatment standards for nonwastewater and wastewater forms of K100. According to 40 CFR Part 261.32 (hazardous wastes from specific sources), waste code K100 is listed as waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting. Treatment standards for K100 wastes were originally scheduled to be promulgated as part of the Third Third rulemaking. However, a treatment standard of 'No Land Disposal Based on No Generation' for K100 nonwastewaters was promulgated on August 8, 1988, and was subsequently revised on May 1, 1989, (54 FR 18836) to be applicable only to nonwastewater forms of these wastes generated by the process described in the listing description and disposed after August 17, 1988, and not generated in the course of treating wastewater forms of these wastes (Based on No Generation).

6/7/10 (Item 1 from file: 41)

179043 92-00992

Treated waste/soil interactions and long-term metal mobility under acid rainwater leaching conditions

Donahoe, R.J.; Gong, Chang-Rui; Chasse, J.L.

Dep. Geol., Univ. Alabama, Box 870338, Tuscaloosa, AL 35487, USA

3. Annu. Symp. of the GCHSRC on Bioremediation, Fundamental and Effective

Application Beaumont, TX (USA) 21-22 Feb 1991

J. HAZARDOUS MATER VOL. 28, NO. 1-2, pp. 236-237, Publ.Yr: 1991

SUMMARY LANGUAGE - ENGLISH

Languages: ENGLISH

Journal Announcement: V23N1

Contents: Column flow-through experiments have been conducted in which a treated municipal waste effluent has been reacted with two silty loam and two sandy loam soil samples having different TOC values, clay contents, and densities to study the attenuation of waste solution metals on soil columns.

CHEMICAL TREATMENT

5/7/1 (Item 1 from file: 103)

03258380 NOV-91-026152; EDB-92-021137

Title: Chemical basis for pyrochemical reprocessing of nuclear fuel

Author(s): Ackerman, J.P. (Chemical Technology Div., Argonne National Lab., Argonne, IL (US))

Source: Industrial and Engineering Chemistry Research (United States) v 30:1. Coden: IECRE ISSN: 0888-5885

Publication Date: Jan 1991 p 141-145

Language: In English

Abstract: The integral fast reactor (IFR) is an advanced breeder reactor concept that includes on-site reprocessing of spent fuel and wastes. Spent metallic fuel from the IFR is separated from fission products and cladding, and wastes are put into acceptable forms by use of a compact pyrochemical process based on partition of fuel and wastes between molten salt and liquid metal. To minimize reagent usage and, consequently, waste volume, electrotransport between metal phases is used extensively for feed dissolution and product recovery, but chemical oxidation and reduction are required for some operations. This paper describes the processes that are used and presents the chemical theory that was developed for quantitatively predicting the results of both chemical and electrotransport operations.

5/7/2 (Item 2 from file: 103)

03242544 INS-91-033168; EDB-92-005301

Title: Mediated electrochemical hazardous waste destruction

Author(s)/Editor(s): Hickman, R.G.; Farmer, J.C.; Wang, F.T.

Corporate Source: Lawrence Livermore National Lab., CA (United States)

Sponsoring Organization: DOE USDOE, Washington, DC (United States)

Conference Title: I EC special symposium of the American Chemical Society

Conference Location: Atlanta, GA (United States) Conference Date: 1-3 Oct 1991

Publication Date: Aug 1991 (14 p)

Report Number(s): UCRL-JC-106676 CONF-9110158--2

Order Number: DE92001819

Contract Number (DOE): W-7405-ENG-48

Language: In English

Availability: OSTI; NTIS; INIS; GPO Dep.

Abstract: There are few permitted processes for mixed waste (radioactive plus chemically hazardous) treatment. We are developing electrochemical processes that convert the toxic organic components of mixed waste to water, carbon dioxide, and innocuous anions such as chloride. Aggressive oxidizer ions such as $\text{Ag}^{\text{sup } 2+}$ or $\text{Ce}^{\text{sup } +4}$ are produced at an anode. These can attack the organic molecules directly. They can also attack water which yields hydroxyl free radicals that in turn attack the organic molecules. The condensed (i.e., solid and/or liquid) effluent streams contain the inorganic radionuclide forms. These may be treated with existing technology and prepared for final disposal. Kinetics and the extent of destruction of some toxic organics have been measured. Depending on how the process is operated, coulombic efficiency can be nearly 100%. In addition, hazardous organic materials are becoming very expensive to dispose of and when they are combined with transuranic radioactive elements no processes are presently permitted. Mediated electrochemical oxidation is an ambient-temperature aqueous-phase process that can be used to oxidize organic components of mixed wastes. Problems associated with incineration, such as high-temperature volatilization of radionuclides, are avoided. Historically, $\text{Ag}^{(2)}$ has been used as a mediator in this process. $\text{Fe}^{(6)}$ and $\text{Co}^{(3)}$ are attractive alternatives to $\text{Ag}^{(2)}$ since they form soluble chlorides during the destruction of chlorinated solvents. Furthermore, silver itself is a toxic heavy metal. Quantitative data has been obtained for the complete oxidation of ethylene glycol by $\text{Fe}^{(6)}$ and $\text{Co}^{(3)}$. Though ethylene glycol is a nonhalogenated organic, this data has enabled us to make direct comparisons of activities of $\text{Fe}^{(6)}$ and $\text{Co}^{(3)}$ with $\text{Ag}^{(2)}$. Very good quantitative data for the oxidation of ethylene glycol by $\text{Ag}^{(2)}$ had already been collected. 4 refs., 6 figs.

5/7/3 (Item 3 from file: 103)

03183354 GRA-91-32591; EDB-91-110790

Title: Review of treatment for hazardous-waste streams (Chapter 21). Book chapter

Author(s)/Editor(s): Grosse, D.W.

Corporate Source: Environmental Protection Agency, Cincinnati, OH (United States). Hazardous Waste Engineering Research Lab.

Publication Date: 1991 (74 p)

Report Number(s): PB-91-191163/XAB EPA--600/D-91/088

Note: Pub. in Library of Environmental Science, v3 Aug 90 and Advances in Environmental Technology and Management, Mar 90.

Language: In English

Availability: NTIS

Abstract: The publication will examine some of the practices being used or considered for use at on-site or commercial hazardous waste treatment, storage and disposal facilities (TSDF). Options for managing hazardous wastes containing heavy metals and/or cyanide compounds involve conventional treatment processes, recycle/reuse applications and waste minimization. Some of the technologies to be reviewed in this section include: precipitation applications such as hydroxide (e.g. lime, magnesium and iron oxyhydroxide), sulfide and carbonate systems; reduction techniques employing chromium, mercury and selenium reducing agents; adsorption/selection techniques using activated carbon ion exchange and hydrous solids; stabilization/fixation with discussion on applications, interferences and landfill design; cyanide destruction, including chemical oxidation (e.g. alkaline chlorination, ozonation/photolysis), electrolytic decomposition and incineration; and pollution prevention measures such as source reduction, recycling and reuse. Each of these options will be described in terms of effectiveness of treatment in removing the hazardous constituents of interest and characterization of the generated treatment residuals or in the case of waste minimization practices, the degree to which the constituents of concern are eliminated at the point of waste generation.

5/7/4 (Item 1 from file: 6)

1538508 NTIS Accession Number: PB91-191163/XAB

Review of Treatment for Hazardous Waste Streams (Chapter 21) (Book chapter)

Grosse, D. W.

Environmental Protection Agency, Cincinnati, OH. Hazardous Waste Engineering Research Lab.

Corp. Source Codes: 034122080

Report No.: EPA/600/D-91/088 1991 74p

Languages: English Document Type: Journal article

Journal Announcement: GRAI9116

Pub. in Library of Environmental Science, v3 Aug 90 and Advances in Environmental Technology and Management, Mar 90.

NTIS Prices: PC A04/MF A01

Country of Publication: United States

Contents: The publication will examine some of the practices being used or considered for use at on-site or commercial hazardous waste treatment, storage and disposal facilities (TSDF). Options for managing hazardous wastes containing heavy metals and/or cyanide compounds involve conventional treatment processes, recycle/reuse applications and waste minimization. Some of the technologies to be reviewed in this section include: precipitation applications such as hydroxide (e.g. lime, magnesium and iron oxyhydroxide), sulfide and carbonate systems; reduction techniques employing chromium, mercury and selenium reducing agents; adsorption/selection techniques using activated carbon ion exchange and hydrolysis.

NEUTRALIZATION

10/7/1 (Item 1 from file: 103)

03289054 DE-92-003559; EDB-92-051811

Title: Application of UASB-reactors to industrial waste-water treatment; performance data and results in granulation control

Author(s): Morvai, L.; Mihaltz, P.; Czako, L.; Hollo, J. (Technical Univ., Budapest (Hungary). Inst. of Agricultural Chemical Technology)

Source: Acta Biotechnologia (Germany) v 11:5. Coden: ACBTD ISSN: 0138-4988

Publication Date: 1991 p 409-418

Language: In English

Abstract: Several types of high organic matter pollutants containing (COD-range: 3-50 kg.m³) industrial waste waters were treated in laboratory scale (1.2-23 dm³) sludge blanket (UASB) and UASB-fixed bed hybrid (UBF) reactors. In most cases higher than 80% of COD-removal efficiency has been attained. The CO₂ content of the biogas developed was mainly influenced by the neutralization (base to acid) ratio related to feed pH. Cell immobilization by granule formation was considered as a change in microbial population: Enrichment and aggregate formation of Methanotrix-like filamentous microorganisms. Based on physiological and physical indexes of microbial selection and with regard to the different sensitivities of microorganisms to substrate inhibition, a new start-up method was developed for rapid (40-45 days) granulation of raw digested sludge. (orig.).

10/7/2 (Item 2 from file: 103)

03285898 EDB-92-048655

Title: Waste knowledge: The key to waste minimization

Author(s): Noskin, H.A. (Idaho National Engineering Lab., Idaho Falls (United States))

Title: DOE model conference on waste management and environmental restoration. Proceedings

Corporate Source: USDOE, Washington, DC (United States)

Conference Title: 6. annual Department of Energy model conference on waste management and environmental restoration

Conference Location: Oak Ridge, TN (United States) Conference Date: 29 Oct - 2 Nov 1990

Publication Date: 1990 p 1, Paper 12 (343 p)

Report Number(s): CONF-9010166--

Order Number: DE91010951

Language: In English

Availability: OSTI; NTIS; INIS

Abstract: Waste minimization is an important aspect of waste management. One very simple way to reduce or minimize waste is through good housekeeping. In this case segregation, and knowing what kind of waste you truly have. A key problem to waste management is the ultra-conservative approach GOCO's have taken. In a time when the contractors are playing catch-up, many decisions have been made without a common sense justification. These kinds of decisions are making a bad problem worse and at the same time confusing employees. Approximately 240,000 kg of hazardous waste is generated in the US annually. There are only about 250 operating hazardous waste landfills, and those are closing at a very fast rate. In addition, soon most hazardous waste will fall under the Land Disposal Restriction requirements. Segregation, neutralization, and sampling are important ingredients to solving waste problems. Make sure that the waste is characterized properly. Anti-c clothing should be visually inspected for hazardous waste contamination; if it hasn't been contaminated, it shouldn't be disposed of as hazardous waste. Non-listed acids and basics can be neutralized and removed. These good housekeeping measures, among other common sense ideas, can reduce waste generated at the source and give employees a clear understanding of good waste management.

10/7/3 (Item 3 from file: 103)

03284549 EDB-92-047306

Title: Effluent testing for the Oak Ridge Toxic Substances Control Act mixed waste incinerator emissions tests of January 16 and 18, 1991

Author(s)/Editor(s): Shor, J.T. (Oak Ridge National Lab., TN (United States)); Bostick, W.D.; Coroneos, A.C.; Bunch, D.H.; Gibson, L.V.; Hoffmann, D.P.; Shoemaker, J.L. (Oak Ridge K-25 Site, TN (United States))

Corporate Source: Oak Ridge K-25 Site, TN (United States)

Sponsoring Organization: DOE USDOE, Washington, DC (United States)

Publication Date: Feb 1992 (52 p)

Report Number(s): K/QT-407

Order Number: DE92008519

Contract Number (DOE): AC05-84OT21400

Language: In English

Availability: OSTI; NTIS; INIS; GPO Dep.

Abstract: On January 16 and 18, 1991, special emissions tests were conducted at the Oak Ridge, K-25 Site

Toxic Substances Control Act (TSCA) Incinerator. Both tests were approximately 6 h long and were performed at TSCA temperatures (1200{degrees}C, secondary combustion chamber (SSC)). Liquid feed and effluent samples were collected every 30 min. A filter was used to collect particles from stack gases to study morphology and composition during the first test. Isokinetic air samples were also taken during the second test. Metals emissions from the second test were evaluated using the Environmental Protection Agency (EPA) Method 5 sampling train. The aqueous waste was collected and fed in batches to the Central Neutralization Facility (CNF), where it was treated by iron coprecipitation and polymer flocculation and data were collected. In the first test (1-16-91), the aqueous and organic wastes were fed directly to the kiln or primary combustion chamber (PCC). In the second test (1-18-91), the remaining organic waste from the first test was fed into the SSC, and other organic waste was fed into the PCC. One objective of the two tests was to determine if feeding the same organic waste into the two combustion chambers made a difference in a partitioning of uranium and other metals. No evaluation of radionuclides other than uranium was made. The partition coefficient of uranium to the quench water was 0.3 on January 16 and 0.35 on January 18; so directing Tank 306A to the feed to the primary vs the secondary combustion chamber appears to have made little difference. The partition coefficient of uranium to the stack on January 18 was 0.0039. 5 refs., 15 figs., 26 tabs.

10/7/4 (Item 4 from file: 103)

03275905 FRD-92-000131; EDB-92-038662

Title: Solidification of TRU wastes in a ceramic matrix

Original Title: Verfestigung TRU-haltiger abfaelle in keramischer matrix

Author(s)/Editor(s): Loida, A.; Schubert, G. (Kernforschungszentrum Karlsruhe GmbH (DE). Inst. fuer nukleare Entsorgungstechnik)

Corporate Source: Commission of the European Communities, Luxembourg (Luxembourg)

Publication Date: 1991 (86 p)

Report Number(s): EUR-13509

Order Number: TI92772855

Contract Number (Non-DOE): FI1W-0021-D (B)

Language: In German

Availability: OSTI; NTIS (US Sales Only)

Abstract: Aluminumsilicate based ceramic materials have been evaluated as an alternative waste form for the incorporation of TRU wastes. These waste forms are free of water and - cannot generate hydrogen radiolytically, - they show good compatibility between the compounds of the waste and the matrix, - they are resistant against aqueous solutions, heat and radiation. R and D-work has been performed to demonstrate the suitability of this waste form for the immobilization of TRU-wastes. Four kinds of original TRU-waste streams and a mixture of all of them have been immobilized by ceramization, using glove box and remote operation technique as well. Clay minerals, (kaolinite, bentonite) and reactive corundum were selected as ceramic raw materials (KAB 78) in an appropriate ratio yielding 78 wt% $\text{Al}_{2}\text{O}_{3}$ and 22 wt% SiO_{2} . The main process steps are (i) pretreatment of the liquid waste (concentration, denitration, neutralization, solid- liquid separation), (ii) mixing with ceramic raw materials and forming, (iii) heat treatment with T max. of 1300{sup 0}C for 15 minutes. The waste load of the ceramic matrix has been increased gradually from 20 to 50, in some cases to 60 wt.%.

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J. A. Klein, J. E. Mrochek, R. L. Jolley, I. W. Osborne-Lee,
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Division of Low-Level Waste Management and Decommissioning
Office of Nuclear Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

10. SUPPLEMENTARY NOTES

Prepared in cooperation with EPA

11. ABSTRACT (200 words or less)

This report details the findings and conclusions drawn from a survey undertaken as part of a joint U.S. Nuclear Regulatory Commission and U.S. Environmental Protection Agency-sponsored project entitled "National Profile on Commercially Generated Low-Level Radioactive Mixed Waste." The overall objective of the work was to compile a national profile on the volumes, characteristics, and treatability of commercially generated low-level mixed waste for 1990 by five major facility categories—academic, industrial, medical, and NRC /Agreement State-licensed government facilities and nuclear utilities. Included in this report are descriptions of the methodology used to collect and collate the data, the procedures used to estimate the mixed waste generation rate for commercial facilities in the United States in 1990, and the identification of available treatment technologies to meet applicable EPA treatment standards (40 CFR Part 268) and, if possible, to render the hazardous component of specific mixed waste streams nonhazardous. The report also contains information on existing and potential commercial waste treatment facilities that may provide treatment for specific waste streams identified in the national survey.

12. KEY WORDS/DESCRIPTORS (List words or phrases that will assist researchers in locating the report.)

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Hazardous Waste
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Waste Treatment

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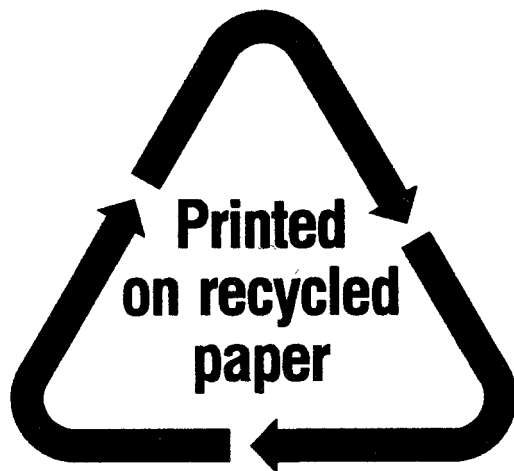
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